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SAFE HOMES

JULY 1917

VOLUME FIVE NUMBER ONE

A JOURNAL FOR ARCHITECTS, PROPERTY-OWNERS, CONTRACTORS, BUILDERS, UNDERWRITERS, FIRE PREVENTION ENGINEERS AND CITY OFFICIALS

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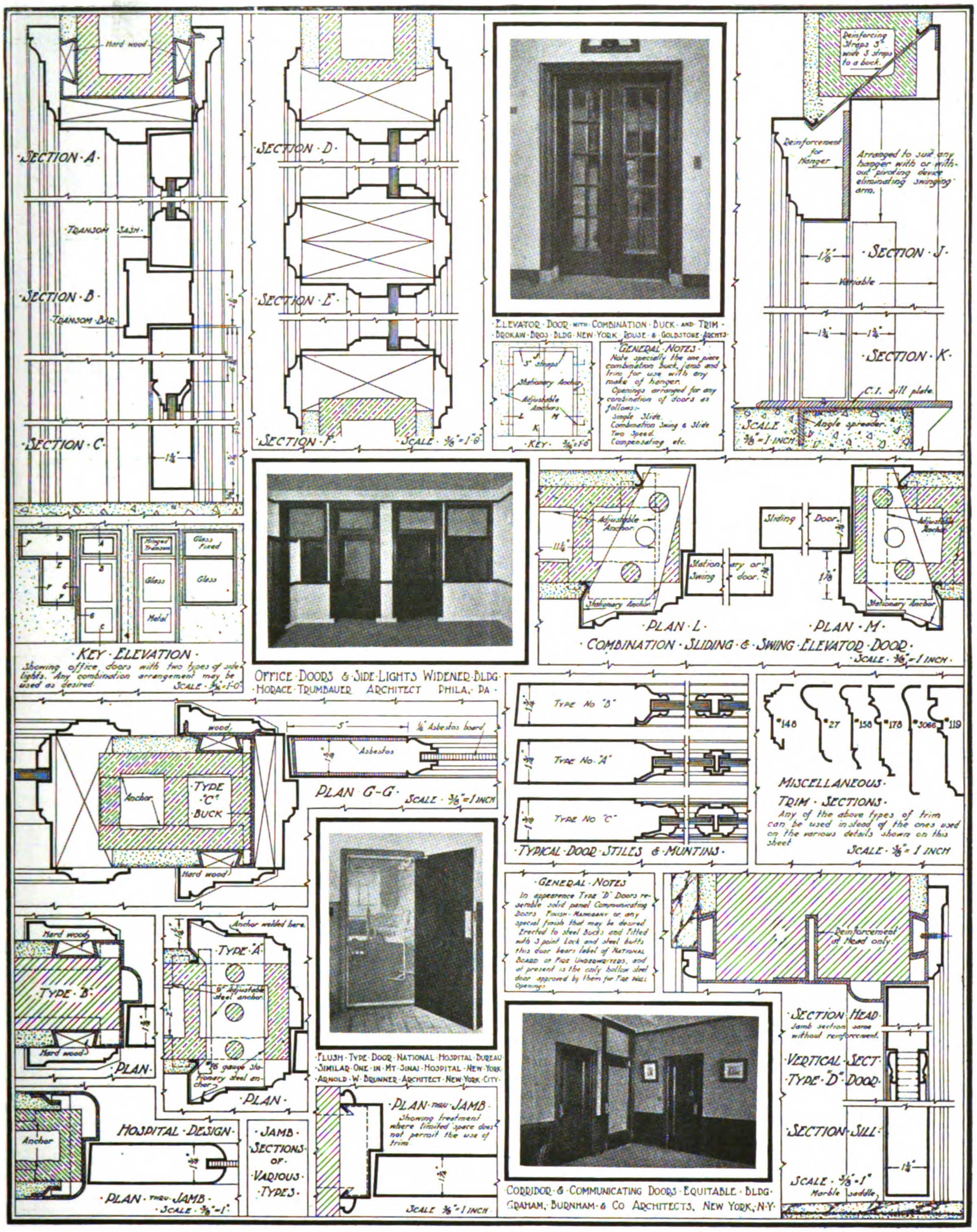
FIRE SAFE DOOR WAYS

STEEL DOORS, BUCKS and TRIM



·ELEVATOR·DOOR·WITH·COMBINATION·BUCK·AND·TRIM·
·BROKAW·BROS·BLDG·NEW·YORK·ROUSE·&·GOLDSTONE·ARCHTS·

·GENERAL·NOTES·

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Single Slide.
Combination Swing & Slide
Two Speed.
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·KEY·ELEVATION·

Showing office doors with two types of side lights. Any combination arrangement may be used as desired.

SCALE · 3/16" = 1'-0"

OFFICE·DOORS & SIDE·LIGHTS WIDENER·BLDG·
·HORACE·TRUMBAUER ARCHITECT PHILA., PA·

Any of the above types of trim can be used instead of the ones used on the various details shown on this sheet

·GENERAL·NOTES

In appearance Type "D" Doors resemble solid panel Communicating Doors. Finish—Mahogany or any special finish that may be desired. Erected to steel Bucks and fitted with 3 point Lock and steel butts this door bears label of National Board of Fire Underwriters, and at present is the only hollow steel door approved by them for Fire Wall Openings

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Tests are invariably more severe than actual conditions

A comparison of the results of such tests on the various standard materials used in wall and ceiling construction will convince you that

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May we send you details of this and other "Kno-Burn" features?

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UNDERWRITERS' LABORATORIES INC
ROOFING MATERIAL
CLASS C
ISSUE No. 118

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"Originators of the Asphalt Shingle"

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ADVOCATING THE CONSISTENT VSE OF
FIREPROOFING MATERIALS & PROTECTIVE DEVICES

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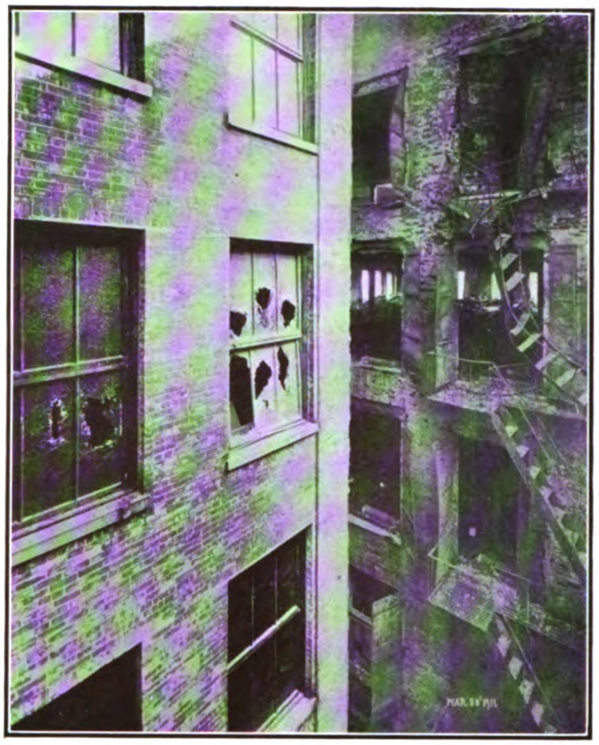

Note the holes punched in the "Wire Glass" windows by the firemen to enable them to fight the fire in the Asch Building from the interior of the adjacent fireproof building, the "Wire Glass" windows acting as a fire shield.

THIS age of Fireproof Construction compels us to be familiar with materials which are approved Fire Retardants.

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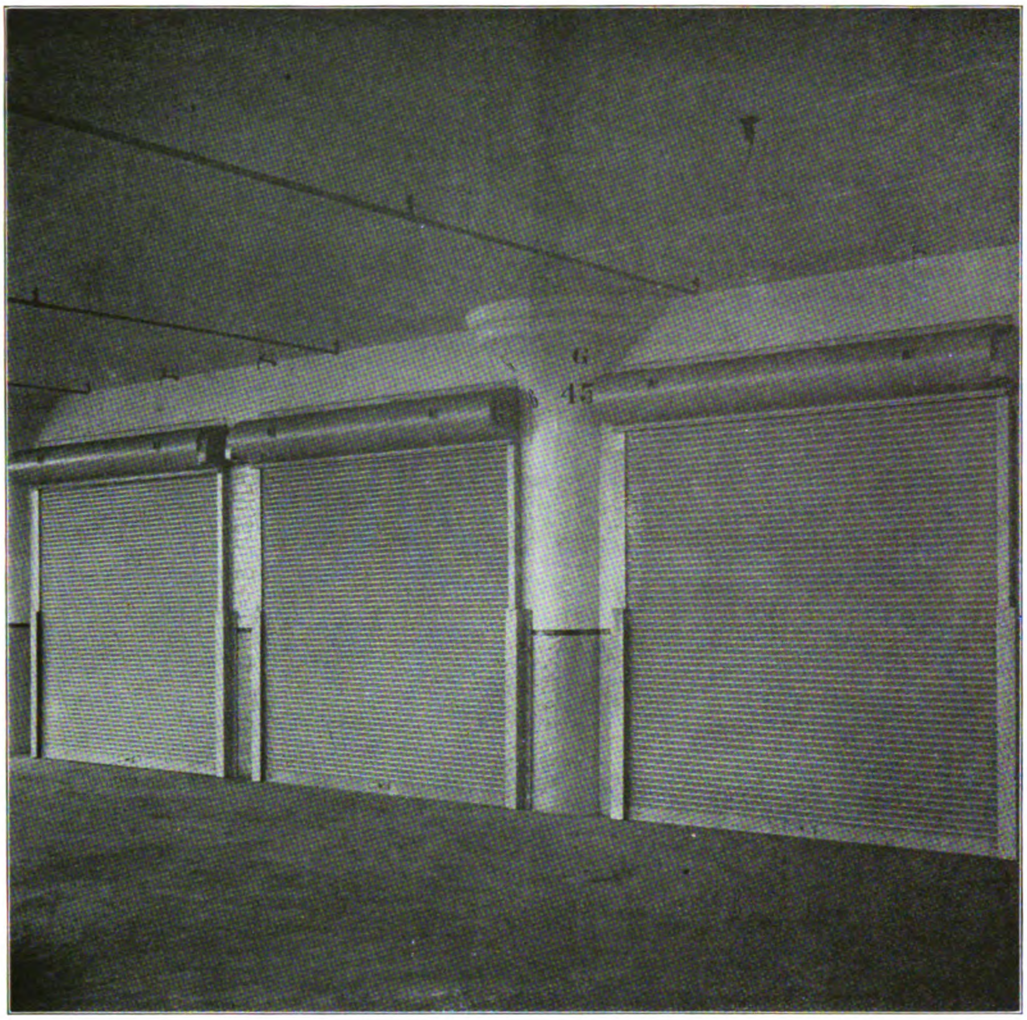

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Of Interest To Architects

And Those Who Desire Protection From Fire

In the April issue of CONSTRVCTION appeared announcement of the formation of the Association of Manufacturers of Approved Hollow Metal Window Frames and Sash, with the object in view of promoting the use of Underwriters Labeled Windows and the refining of the constructions and increasing in number the various types and designs of labeled windows to more completely meet the architectural requirements of the various designs of buildings.

That much progress is being made by this ASSOCIATION is indicated elsewhere in this issue, in the report of tests of various new constructions not heretofore labeled by the Underwriters Laboratories.

Larger windows, smaller mullions, smaller muntins and single light sash, are all features receiving attention with good results.

The Construction Committee will be pleased to answer any inquiries as to the latest stages of progress.

Construction Committee

Name	Firm	Address
Frederick de Coningh	The Sykes Co.	930 W. 19th Place, Chicago, Ill.
J. C. McFarland	McFarland Hyde Co.	27th St. and 5th Ave., Chicago, Ill.
Frank Voigtman	Voigtman & Co.	445 W. Erie St., Chicago, Ill.
John Bogenberger	Consolidated Sheet Metal Works	661 Hubbard St., Milwaukee, Wis.

Members of Association

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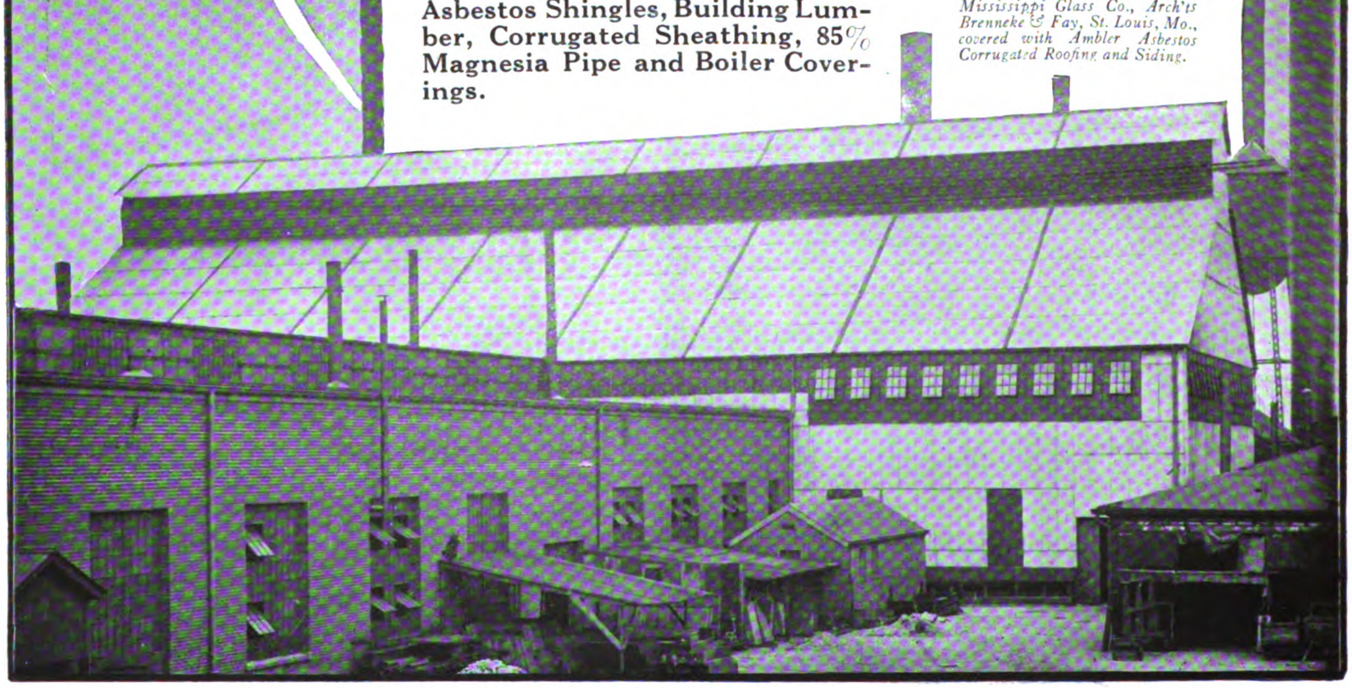


Mississippi Glass Co., Arch'ts Brenneke & Fay, St. Louis, Mo., covered with Ambler Asbestos Corrugated Roofing and Siding.

CONSTRVCTION

ADVOCATING THE CONSISTENT VSE OF
FIREPROOFING MATERIALS & PROTECTIVE DEVICES

VOL. V JULY, 1917 No. 1

Fire Underwriters Aiding the Government

AN outline of the way in which the National Board of Fire Underwriters is aiding the Federal Government in safeguarding grain elevators, cotton warehouses and kindred properties against fire is set forth in a recent communication by W. E. Mallalieu, general manager of the underwriters' association.

Aside from its conservation service the National Board "has been able to furnish a very considerable amount of information to several of the sub-committees of the Council of National Defense and to some of the departments of the Government. To the Board of Munitions we have furnished and are still furnishing classified lists of factories capable of manufacturing munitions and many other commodities needed by the Government for war purposes. We have co-operated with the Emergency Construction Board, the Storage Committee of the General Munitions Board, and the Cantonment Committee by furnishing maps and diagrams of standard warehouses, also maps showing in detail the dock facilities at the principal Eastern ports. We have provided for the use of Mr. Hoover's Department maps and diagrams showing the construction, area, capacity and fire protection of the terminal grain elevators at the principal grain storage centers. Two highly qualified engineers have been detailed for permanent service with the Emergency Construction Board and are planning and supervising the construction of water works and designing the systems of fire protection for all of the new cantonments and for other new structures which the Government is erecting. In addition one of our engineers has been detailed to direct in person at each cantonment the lay-out of water mains, the organization of fire brigades, and the installation of both temporary and permanent fire protective apparatus."

Practical as Well as Desirable

THAT it is practical as well as desirable to so reconstruct existing dilapidated wooden buildings as to add to their utility, artistic appearance and fire safety is evidenced by the experience of a well-known Long Island garage owner, whose effort in such connection is detailed in an article appearing elsewhere in this issue of CONSTRVCTION.

Advocates of better construction methods appreciate that while improvement may be enforced in new construction—and happily the trend is steadily toward such improvement—the existence of old structures, especially those of frame exterior and having wood shingle roofs, yet constitute a fire menace that in large degree nullifies the benefit accruing to communities through the erection of buildings of fire-resisting types. Unless kept in a state of constant repair frame structures deteriorate rapidly and not infrequently become eyesores, as well as menacing the health and safety of all living in proximity thereto.

That such an undesirable condition may be remedied and upon terms that will prove financially profitable to the investors, as well as benefiting the community at large, the economics given in connection with the story on page 13 convincingly attests.

The example of Mr. Connell is one that could with distinct advantage be followed by property owners all over this broad land, and were such practice to become general not only would people be more comfortably housed and their property, as well as their lives, be measurably safe from fire, but a distinct economic gain would have been made.

Penalizing Wood Shingle Roofs

COMMUNITIES in the South that continue to tolerate the free use of wood shingles as roof coverings and the fire menace it entails, in future must pay for the privilege, the insurance companies having flatly refused at many points to assume the hazard of such risks without receiving additional premium.

At Birmingham, Ala., following the repeal of the safety anti-wood shingle roof act, rates upon all structures using them were advanced a flat 15 per cent. This action by the underwriters caused consternation in the lumber camp, but its reasonableness cannot be questioned.

By order of the Texas Rate Making Board, all properties covered with wood shingles must pay a penalty of 25 cents instead of 15 cents as heretofore.

Anti-Wood Shingle Legislation

Although located in the heart of the hardwood district, Asheville, N. C., a short time ago adopted an ordinance barring the future use of wood shingle roofs; repairs upon existing structures are permitted only to the extent of 20 per cent. Further, it is required that present wooden roofs be replaced with those of an incombustible character within nine years.

Baton Rouge, La., too, has fallen into line in legislating against this form of fire danger, and its example in all probability will be speedily followed by that of other communities in the State. The inexorable logic of events has decreed that—

The Wood Shingle Must Go!

Nomenclature

THE desirability of an acceptable nomenclature covering the structural field is well recognized. There are at present several organizations which, through committees, are studying this question. The following bodies have committees on nomenclature at work:

Society for the Promotion of Engineering Education.

American Concrete Institute.

National Fire Protection Association.

American Society for Testing Materials.

Suggestions have been advanced that it would be desirable that a joint committee from all of the principal interested organizations be created on nomenclature, and Constrvction believes that the formation of such a committee would be very desirable. The Committee on Nomenclature of the Society for the Promotion of Engineering Education has taken action looking to the formation of a joint committee, and we hope its effort will be crowned with success.

Among the terms or words which have received considerable attention in connection with the proper classification of structural materials and completed buildings are found the following: "Fire-proof," "fire-resisting," "fire-retardant." Thomas Nolan, F. A. I. A., Professor of Architectural Construction, University of Pennsylvania, who is also Editor in Chief of Kidder's Architects' and Builders' Pocketbook and Chairman of the General Committee on Materials and Methods of the American Institute of Architects, has sent Constrvction the following timely contribution on this subject:

"In regard to the *terms* "fire-proof," "fire-resisting," "fire-retardant," etc., there are real difficulties to be overcome. In regard to the verbs, adjectives and nouns of these descriptive terms we seem to have the following groups:

I.

(Missing)	Verb
Fire-resistive	Adjective
Fire-resisting	Adjective
a Fire-resistant	Noun
Fire-resistance	Noun

"Fire-resistiveness of materials." Why not use "fire-resistance" instead?

II.

to fireproof	Verb
fire-proof	Adjective
fireproofing	Noun

The system of compounding of words is based on the system used in the latest unabridged Standard Dictionary.

III.

(Missing)	Verb
fire-retardative	Adjective

(Tending or having the power to retard fire, etc.).

fire-retardant	Adjective

This is a "rare" form according to the Standard Dictionary. I note that it is used on p. 269 of the June number of Constrvction.

fire-retardant	Noun

Not given in Standard Dictionary as a noun.

As there has been so much discussion in regard to these terms and so much indecision still in regard to which shall be given up and which employed, I thought the above notes of my own might be of some interest to you and to your readers."

Portland, Ore., Modernizes Its Building Code

ARCHITECTS and engineers who have studied the new building code proposed for Portland, Ore., generally endorse it and have so expressed themselves at the several hearings before the council.

A notable provision of the proposed ordinances is the zoning of the city; limiting the height of buildings and defining the uses to which they may be put.

Medals for Building Excellence

TO stimulate improvements in building construction the Southern California Chapter of the American Institute of Architects has decided to award three medals annually for buildings erected during the year preceding the date of the award. The first award will be for residences costing from $2,000 to $10,000 each; the second for residences costing beyond $10,000, and the third for buildings other than residences.

Converting Old Buildings into Profitable Undertakings

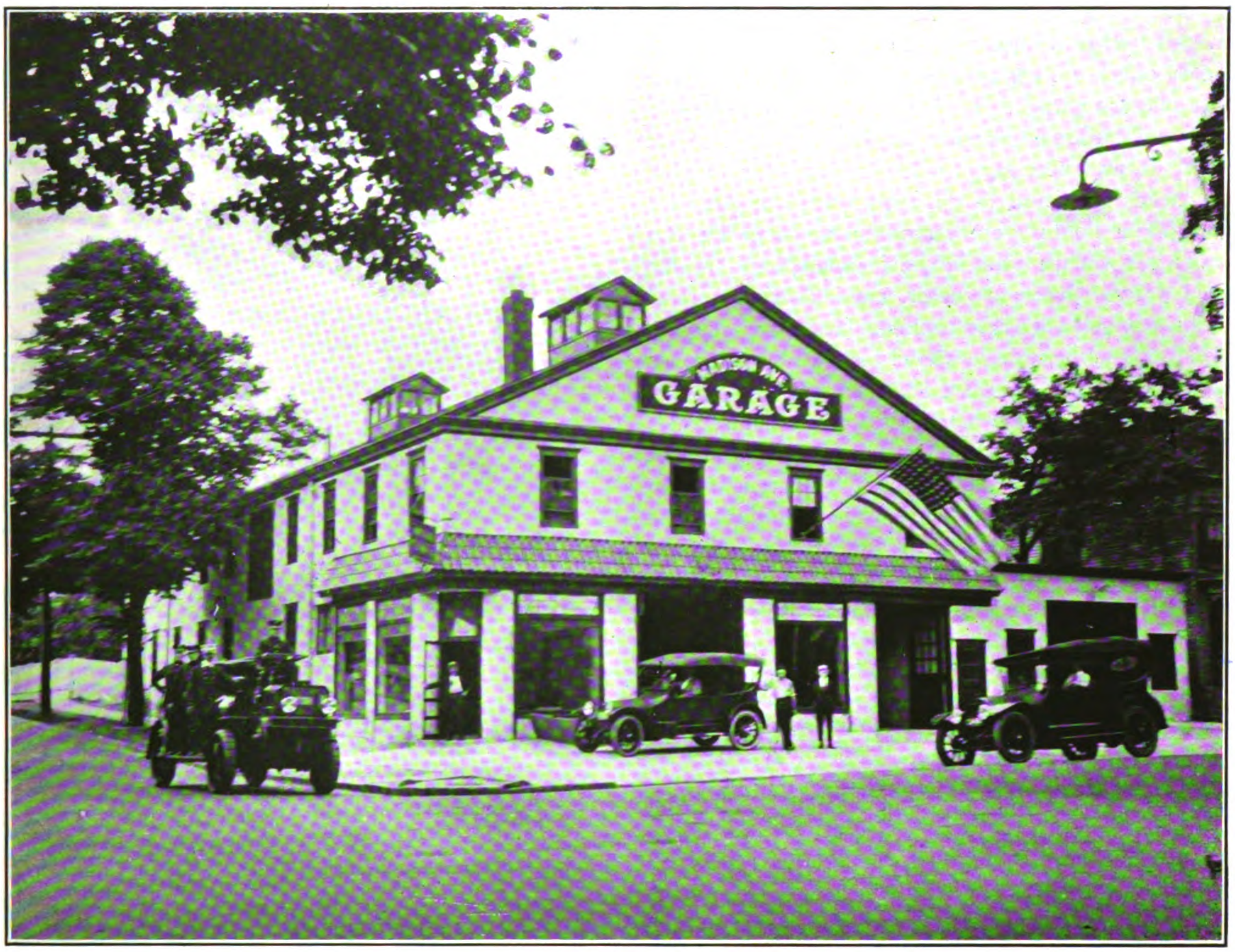
THE City of New York has just passed an ordinance permitting the conversion of existing non-fireproof buildings into garages when not over 50 feet or four stories in height and when made more fire-resistant in accordance with rules to be formulated by a committee appointed by the Board of Standards and Appeals.

It is then peculiarly appropriate that we should describe in this article what has been recently done to convert an old stable in Flushing, Long Island, into an attractive and thoroughly modern fire-resisting garage.

James H. Connell bought a piece of land fronting 79 feet on Madison avenue and 125 feet on Union street in 1881, for $3,000. He immediately built thereupon a two-story and basement frame building 50 feet by 110 feet over all, at a cost of $10,040.00.

The structure was used as a livery stable up to the early part of this year. The decadence of the popularity of the horse and the growing use of automobiles induced Mr. Connell to build a one-story frame addition to his barn, 29 feet by 110 feet over all. This addition was used for the past few years as a garage.

The extension of his automobile business caused Mr. Connell to abandon the livery feature altogether and to devote all of his attention to automobiles. To carry out this intention, he decided to improve his property, and to make this improvement noteworthy.



Practical Example of the Conversion of an old Frame Building into a Structure of Fire Safety and General Attractiveness

Mr. Connell decided to tear down the stable and to erect on the entire plot the best garage building he could have designed. He had plans prepared by A. Edward Richardson, architect, of Flushing, and submitted these for approval to the Building Department. The architect's plans called for a two-story building, 125 feet by 79 feet, of brick and concrete, which was estimated to cost approximately $40,000.

Mr. Connell then learned that the law would not permit him to build a new garage in that location, but that he would be allowed to improve the garage he was then using, viz., the one-story addition at the side of the main building, to the extent of 50 per cent of the value of the existing buildings. He was thus compelled to change his plans. In place of tearing down the frame buildings and erecting an entirely new structure, he was compelled to undertake the remodeling of his frame buildings. How he did this and with what result, makes interesting reading. Remember, his frame buildings were unsightly, unsanitary, highly fire dangerous and decidedly prejudicial to the property values in the vicinity.

The architect, Mr. Richardson, has supplied CONSTRVCTION with the following description of what was done to effect the conversion of the old frame stable into a modern garage.

The old building entrance level was 3 feet above grade. It was necessary to lower this floor to give more head room and to do away with the entrance ramp. The floors were strengthened to carry 200 pounds per square foot by new supporting I-beams placed 8 feet center to center, carried by new steel girders supported by new columns 16 feet on centers.

In strengthening the floors the old wooden base was retained. On this was placed a concrete slab 4 inches thick, consisting of one part Portland cement, 3 parts of clean sharp sand and four parts of clean steamboat cinders. This slab was reinforced with Clinton Woven Wire Cloth No. 8-10 and 4 inch by 12-inch mesh. The surfacing was a ¾-inch cement topcoat laid off in 4 feet squares. The floor of the office in the northeast corner was constructed of I-beams and 6-inch cinder concrete slab forming the roof of the boiler room below, which is entirely enclosed within 12-inch brick-walls with exit to street and no connection with the main building.

Attractive Exterior Finish

The spaces between the 2-inch by 6-inch studding forming the framing of the exterior walls were filled with cinder concrete flush with the inside faces of the studs. The "novelty siding" forming the outside surface of the old building was retained. The inside and outside surfaces of the exterior walls were then furred and lathed with 22 gauge expanded metal, galvanized, and then given three coats of Atlas Portland cement plaster, finished to ¾ inch grounds on both the inside and outside surfaces of the exterior walls. On the outside the third coat consisted of white Portland cement mixed with proper aggregates and applied in the form of a rough dash finish.

The ceilings were treated in the same manner as the inside and outside surfaces of the outside walls, being furred and lathed with galvanized metal lath and plastered with Portland cement plaster to ¾-inch grounds.

The layout of the remodeled building provides an enclosed office, with vault, toilet and lavatory, situated at the northeast corner, having large plate glass windows on both streets, automobile show room and chauffeurs' wash room. A completely fitted machine shop was also installed in the rear of the building. The garage is equipped with the latest devices and conveniences, including a Wayne gasoline system with 400 gallon tank buried in concrete at least 12 inches thick and two feet below the cellar floor. The building has a tin roof.

The exterior color scheme is brown trim contrasting with the white stucco of the walls. The contract was signed on March 17th, 1917, and completed on May 15, 1917, the general contractor being Donald MacDonald of Botanic Place, Flushing.

It is interesting to consider the economics of the metamorphosis of this property into a thing of beauty and usefulness.

Figured in Dollars and Cents

Had the owner erected a new building he would have had to tear down the old structure, the value of which would thus have been destroyed. He would then have secured the following results:

New building estimated cost	$39,070.00
New building would have contained	217,052 cu. ft.
New building would have cost per cu ft	18c
New building would have contained floor space	19,750 sq. ft.
Cost per square foot of floor space	$1.98

The owner would therefore have had to provide practically $40,000 to accomplish the above.

He was, however, compelled to abandon the plan of erecting a new building and instead remodeled his old one, with the following results:

Cost of remodeling old building	$15,000.00
Deducted from the sum he would have had to provide for a new building of	$40,000.00
Saving of investment	$25,000.00

The further results of the remodeling were as follows:

Cost to remodel old building	$15,000.00
Buildings contain	207,900 cu. ft.
Cost per cubic foot	7.22c
Buildings contain floor space	14,190 sq. ft.
Cost per square foot of floor space	$1.05

The buildings as remodeled contain much greater

A RESOLUTION asking the Federal Government to investigate the present high cost of building was adopted at the latest meeting of the Kansas City, Mo., Chapter of the American Institute of Architects.

values than the cost figures shown above, the difference being profit. Taking the original cost of the frame buildings as a part of the present value we have the following:

Old building erected in 1881 cost then	$10,040.00
Addition thereto	3,000.00
Remodeling March to May, 1917	15,000.00
Total	$28,040.00

Contains cubic feet	207,900 cu. ft.
Cost per cubic foot	13.4c
Contains floor space	14,190 sq. ft.
Cost per square foot	$1.97

That more than the above values now actually exist in the building as remodeled is proved by a recent appraisal, which shows a valuation of $40,000. This appraisal compared with the moneys expended shows the following:

Present value of land	$ 7,500.00
All costs of buildings as shown above	28,040.00
Difference between cost and appraisal, being profit	4,460.00
Total	$40,000.00

Summarizing the economics of the whole transaction we have thus seen that the owner financed the operation with $15,000.00 cash instead of requiring $39,070.00 if he had erected a new building; he saved the money and structural values of the old buildings and secured values of $4,460.00 more than the total that he had spent in buildings and improvements between the years 1881 and 1917, not counting the increment of value to the land amounting to $4,500.00 since 1881.

He also removed a fire and health menace from a residential neighborhood and through this has brought about an increase of values of all properties within a distance of one and one-half blocks from the building, of at least 20 per cent.

Here is a striking example of the money value of beauty, safety and utility combined. Owners of fire dangerous and unsightly frame structures might well consider and see if they cannot profit by Mr. Connell's experience by "doing likewise."

New York City's New Garage Law

AN ordinance permitting the erection of four-story non-fireproof garages not exceeding 50 feet in height became effective in New York City on July 17.

The law requires all non-fireproof buildings hereafter erected, altered or converted into garages to receive adequate fire protection according to rules to be adopted by the Board of Standards and Appeals regarding the use of fire-resisting materials. The measure further provides that all wooden floors, roof construction, columns, and girders must be covered on all exposed sides with fire-resisting materials, excepting that one-story buildings without basement are not required to have protection for the roof construction.

The most important feature of this is that existing non-fireproof garages are permitted, excepting that they are required to conform to standards of fire protection building rules to be adopted by the Board of Standards and Appeals.

We describe elsewhere in this issue the conversion of an old frame stable into a highly fire-resisting garage and we believe that this article explaining what has actually been done recently in this way will be of timely interest in view of the recent passage of the the new Garage Law in New York; the great number of such existing buildings and the growing need for garages throughout the metropolitan territory.

Concrete Board in House Building

BOARDS of concrete, with joists, rafters and stair frames of the same material, are used in the construction of a novel building in Los Angeles, Cal., the whole being set upon a concrete foundation, says the *Scientific American*. Though put together after the manner of a frame structure, the building is as fireproof and durable as the more common types of cement houses, but it requires less material and is lighter in weight.

The various parts are poured into forms on the ground near the site, and in that way the danger of breakage is eliminated. The clapboards are poured in sets of ten, the forms being securely clamped together and the cement allowed to harden in them for several days. Then they are taken out and allowed to cure before being set up. This should be done while the preliminary work is going on, such as excavating and laying the foundation.

The joists, rafters and other parts are formed in the same manner, and various types of reinforcing are used for each. The boards are reinforced with mesh like chicken wire, while the timbers have iron rods of varying thickness to strengthen them. These are allowed to project at one end in order to fit into corresponding holes in other timbers, so that the whole framework dovetails. The method of attaching the boards to the 2 x 4's is with nails, and nailholes are bored into the cement boards before they have set by running a wire through them. As the cement timbers will not take the nails, a strip of wood about an inch and a half thick is wired to the cement scantling. The advantage of this type of concrete structure is that it is light in weight and therefore does not require a very heavy foundation, and the building method allows air space between outer wall and the plastered interior.

To Study Corrosion of Steel Imbedded in Gypsum and Concrete

IN the course of a discussion of the report of Committee A-5 on the corrosion of iron and steel at the latest annual gathering of the American Society for Testing Materials, held in Atlantic City, Prof. W. A. Slater, of the University of Illinois, suggested that the committee study the corrosion of imbedded steel in gypsum. He urged that a method be formulated for determining the amount of such corrosion and that, if feasible, such method be applied to both steel reinforcement of gypsum and of concrete.

Chairman S. S. Voorhees promised that the committee would give the subject serious consideration.

During the discussion following the presentation of the report of the Joint Committee on Concrete and Reinforced Concrete by Committee C-2 on Reinforced Concrete, the question of corrosion was again brought up. R. J. Wig, of the United States Bureau of Standards, Washington, referred to the fact that he and L. R. Ferguson, of the Portland Cement Association, had recently completed an inspection of reinforced concrete structures subject to the influence of salt air and salt water, situated on the coast line of the United States. This inspection had disclosed disquieting conditions, in that steel reinforcement in such structures showed considerable corrosion. Mr. Wig made the statement that the sum total of the damage that they found would run into millions of dollars, all due to the corrosion of the steel in these structures.

The report of Committee C-5 on Fireproofing, Prof. Ira H. Woolson, chairman, was adopted as a tentative standard to be printed in the Proceedings. This report embodied the work of the conference of representatives from Government, insurance and scientific bodies, which has been referred to in the pages of CONSTRVCTION and is mentioned in the articles on a National Building Policy in the June and July issues.

The report of Committee D-8 on waterproofing raised the question on the floor as to the proper distinction which should be drawn between "waterproofing" and "dampproofing."

The committee agreed to formulate definitions for both of these terms and that both should be embodied in the titles of the tentative specifications submitted.

An interesting and valuable paper was read by Walter A. Hull, of the United States Bureau of Standards, Pittsburgh, describing the results of tests he conducted to determine the heat flow into different structural materials.

During the last session D. Knickerbacker Boyd suggested that a closer co-operation should be brought about between the architects of the country and the American Society for Testing Materials, and that it would be desirable for architects to be included in the membership of many of the technical committees. Mr. Boyd's suggestion was referred to the Executive Committee for consideration and action.

Many other matters of general interest were presented and discussed.

Attendance at the gathering exceeded that of last year; a fact doubly gratifying in view of the many distracting features of the present season.

General W. H. Bixby was elected president of the Society and Prof. Edward Orton, Jr., of the Ohio State University, vice-president.

C. D. Young, of Wilmington, Del.; J. A. Capp, of Schenectady, N. Y.; W. M. Kinney, of Chicago, and W. F. Goss, of New York City, were chosen to membership upon the Executive Committee.

Because of illness Secretary Marburg was unable to attend the gathering; in his absence the duties of the secretary were very acceptably performed by Assistant Secretary C. L. Warwick.

Wood Shingle Roofs in Dry Weather

CITIZENS of Kansas, and particularly the farmers, are warned by State Fire Marshal Hussey to be unusually vigilant in guarding against the fire menace in dry weather.

In part Marshal Hussey says:

"The danger of a fire spreading and developing into a conflagration is particularly great at a time when roofs, sheds, frame walls and all combustible building material are dry and parched. At such times shingle roofs in particular are like tinder. A spark from a kitchen stove, a passing train, or from running machinery, a match or cigarette carelessly thrown down may start a blaze that will result in the destruction of an entire town. The flames once started are almost impossible to control.

"On the farm any one of the same causes may result in just as complete a ruin so far as the group of buildings on the one farm is concerned, and it sometimes happens in a high wind that embers are carried from one farm to another, even though they are separated by a quarter section of land."

The warnings hold good the year round.

Classifying Fire-Resisting Building Materials and Construction Methods

WHAT the Committee on Construction of Buildings of the National Board of Fire Underwriters holds to be its "most important accomplishment" during the fiscal year ended May 1, last, "resulted from a joint conference of ten national technical organizations, which adopted "the principle of classifying all fire-resisting materials and construction into three or more grades, based upon the degree of protection which they would afford when measured by a standard method of fire test, and designated these by the terms "One-Hour Protection," "Two-Hour Protection," etc. The standard to be used was also established in tentative form. This work, when finally corrected and adopted as recommended practice, will greatly simplify the work of classifying construction for building codes and will remove the confusion which now exists everywhere regarding specifications for fire tests."

Uniform Grading of Buildings

"Concurrent with this work," the committee further says, "much has been accomplished in the matter of grading buildings uniformly according to construction, and specifications for several types of buildings have already been prepared, notably for hotels, clubs, office buildings and department stores. All of this will later become standard practice for the National Board of Fire Underwriters to consider and probably recommend."

The organizations associated with the National Board in the consideration of building material and practice classification were: the Underwriters' Laboratories, Inc.; National Fire Protection Association; United States Bureau of Standards; American Society for Testing Materials; Associated Factory Mutual Fire Insurance Companies; American Society of Mechanical Engineers; American Society of City Engineers; Canadian Society of Civil Engineers; American Concrete Institute.

Improvements in Code Legislation

Summarizing its work of the past twelve months, the Committee reports, in part:

"The activities of this committee naturally revolve with more or less regularity around the influence for good construction created by the distribution of its publications. Its accomplishments are likewise gauged by the nature and extent of the demand for such publications, though by no means measured by a single yearly output. The effect of the committee's work is necessarily cumulative in character, therefore its value must be measured by study of average results covering a period of years.

"The distribution of our publications for the year has been as follows:

Building codes	1,336
Ordinance for small towns	179
Dwelling houses	12,100
Report of Far Rockaway Fire	2,250

"During the year we have been in communication with sixty-four cities, which have expressed an intention to revise their building ordinances. Copies of our code have been furnished to them and advantage taken of the opportunity to do everything possible by way of correspondence to secure the adoption of our ideas.

"Our revised building code has been in use two years, and its influence is only now beginning to be really apparent.

"City Commissions, appointed to draft new building ordinances, usually render voluntary service, and the work is liable to be slow. It takes approximately two years for the average commission to complete an ordinance ready for consideration by city authorities, and not infrequently a year or so more will elapse before public opinion has been educated to realize the necessity for rigid building restrictions, or private interests demanding lax building legislation have been sufficiently placated by destructive amendments to permit actual adoption of the ordinance.

"It is gratifying to note that the standard of building code legislation throughout the United States is materially improving year by year. From the nature of this improvement we know the National Board Building Code has been a strong factor in this reformation, either by direct application, or indirectly through the influence of other codes fashioned after it. This influence is bound to increase rapidly in future years if we maintain our own standards abreast of the best current practice in engineering and fire prevention with occasional advanced steps based upon accumulated experience.

"Upon request, we have made careful analysis of eighteen city building ordinances during the year. The majority of these were new codes; the others were existing ones which were criticised to indicate the necessity for revision instead of amendment. We are pleased to state that where the codes proposed were new ones, the majority of our recommendations have been accepted. Most of the new codes were excellent in nearly all their provisions—far in advance of the best codes in the country fifteen years ago. Several of these new codes are nearly verbatim copies of our own code, and most of the others have incorporated large portions of it.

"Last year we reported four universities and technical schools using our building code as a textbook. This was a new and promising field to cultivate. We are pleased to state that the number of such institutions using the Code this year has been increased to fifteen. Over three hundred upper class men in courses in architecture and building construction are thus securing an intimate acquaintance with our recommended building practice. The importance of familiarizing such young men with the standards of the National Board of Fire Underwriters is self-evident.

The National Board Building Code was officially endorsed as a recommended standard of building construction by the National Fire Protection Association at its last annual meeting.

Widespread Demand for Publications

"The demand for our pamphlet, 'Dwelling Houses,' has been such as to necessitate a liberal reprint of same. Five technical journals have republished it almost completely, and the National Lumbermen's Association have distributed two bulletins entitled 'Building Code Suggestions,' each containing forty pages of matter, including illustrations, extracted from this publication. One bulletin was devoted to chimney construction, the other to fire-stopping, and both strongly urged our recommended practice.

"We supplied the American Institute of Architects with 1,238 copies of 'Dwelling Houses' for distribution to its members. We also recently furnished the State Insurance Commissioner in North Carolina with 100 copies, and he has purchased 200 additional copies at cost price for distribution among the schools of his State. Upon request of the U. S. Lighthouse Service, we have supplied each of its inspectors in the United States and its insular possession with copies of this book. It appears to be fulfilling its mission well.

"Our report upon the Far Rockaway Fire attracted wide attention, because of the bearing the criticism offered had upon the insurance business. Two reprints of the report were necessary to supply the demand.

"Our consulting engineer is in active service on numerous committees in various national technical societies working on all phases of fire prevention as related to building construction. He is also serving on an Advisory Committee on Standards of Fire Protection of the U. S. Bureau of Standards. These different committees are composed of earnest, qualified men, and the results of their study is sure to be far-reaching eventually in its effect upon the national problem of reducing fire losses."

Davenport, Iowa, Adopts Sensible Building Code

FOR the purpose of regulating "the construction, alteration, reconstruction, removal, maintenance and equipment of buildings, in so far as fire prevention, structural strength and danger to people and property are concerned, the authorities of Davenport, Iowa, a short time ago adopted a new building code, the provisions of which are now in full operation.

An immediate effect of the code's acceptance was an improvement in the city's rating by the fire insurance companies, the underwriters thus showing in substantial form their approval of the reduction in Davenport's fire hazard which enforcement of the new ordinances will bring about.

The code was compiled and edited by Ralph Graham, Building Commissioner of Davenport, who is an earnest student of building practice and keenly alive to the fire menace. As a result the code, in Mr. Graham's opinion, "embraces everything along the line of fire protection and prevention."

Naturally, in the consideration of fire prevention primary attention was given to roof coverings, and the new code prohibits the further use of the dangerous wood shingles anywhere in the city. Repairs to the existing structures are permitted to the extent of 40 per cent.

Automatic Sprinklers

All structures of designated types now in existence or hereafter to be erected must be equipped with automatic sprinklers.

Classified by occupancy the buildings in which use of sprinklers is demanded is as follows:

Non-fireproof stables, if three or more stories in height and if in part occupied as living rooms; non-fireproof cold storage warehouses; buildings used for sale or manufacture of combustible merchandise; office buildings and club houses; parish halls, lodge halls, dance halls, banquet halls, skating rinks and assembly halls; moving picture theatres and vaudeville shows; public theatres; tenement and apartment buildings; department stores; school houses and buildings used for general instruction.

Automatic Fire Doors and Windows

Use of an approved automatic fire door or window is required in all fire wall openings, and all door openings into shafts. "When three or more buildings used for stores, factories or warehouses communicate by openings through separating fire walls, the openings shall be protected by double fire doors, and each building shall also be provided with a system of automatic sprinklers."

A National Building Policy

PART II.

(Continued from June Number)

THE development which has taken place of a logical and fundamental plan of classification of materials and buildings has been described in our previous article.

This plan embraces the following features:

1st—Classifying the fire resistance of materials of construction.

2nd—Protection—automatic or otherwise—of completed buildings and their contents against fire.

3rd—Establishment of "classes" of buildings, depending upon the occupancy or uses to which such buildings are put.

4th—The development of specifications broadly governing the construction of completed buildings for each "class" into three or more grades for each "class," with due consideration given to the manner of assembling materials of construction, design and the protection employed or available against fire.

The plan above outlined indicates that there is a definite tendency towards encouraging less costly types of construction than the massive conflagration-proof types upon which attention has been almost wholly centered in the past. There is no thought in this plan to abandon the use of the massive forms of conflagration-proof construction, but the fact is becoming recognized that such highly fire-resistive buildings are only occasionally found even in the best built cities and serve, not as general barriers to fire, but only as individual hindrances to its progress.

This development of the idea, and of a practical plan for recognition and encouragement of the less costly, less massive forms of fire-resistive construction, is a good augury. By being used more generally, such lighter fire-resistive construction (in place of those now used which are generally readily burnable) would introduce conditions which would reduce the probability of any fires assuming large proportions. This is one great step forward in preventing conflagrations, as it would manifestly be better to erect many buildings in which fire could not gain headway than to build only a few structures of the highly fire-resistive character and surround them with a great number of readily burnable buildings. Let us by all means have the occasional highly fire-resistive building, but let us at the same time have a large number of structures of lesser fire-resistive value in place of those of a readily burnable character.

This development indicates that as time goes on less fires are going to be fought by the old style hose stream and fire department methods and that the buildings of the near future will be better protected against fire by proper design, by sprinklers and other automatic protection. Our National Building Policy, therefore, must take these tendencies into consideration in the study of materials and the creation of completed buildings.

The general acceptance of a National Building Policy sooner or later will become a fact. It is inevitable, and this acceptance will occur more quickly when all of the existing agencies which are more or less directly interested place their seal of approval upon it.

Among such agencies stand out prominently the following:

United States Government, through its different departments and its Bureau of Standards.

American Institute of Architects and all local architectural societies.

National Fire Protection Association.

State Fire Prevention Bureaus.

American Society for Testing Materials.

Fire Marshals' and Fire Chiefs' Associations.

National Board of Fire Underwriters.

Underwriters' Laboratories, Inc.

Fire Insurance Rating Bureaus.

Associated Factory Mutual Fire Insurance Cos.

Universities and colleges having courses in architecture and engineering.

Engineering societies.

Associations of manufacturers.

National Association of Credit Men.

Chamber of Commerce of the United States of America.

Chambers of Commerce and Boards of Trade of different cities.

Departments and officials of cities and states administering building laws.

What a force for good would be exerted if all of these activities could be linked together in advocacy of one policy! *A National Building Policy will supply the missing link.*

We believe that useful purposes will be served in furthering or effecting co-operation among the agencies above named by giving brief descriptions of their respective functions and present activities.

United States Government

Certainly an economic problem of the immense proportion which our National fire loss, directly and indirectly, assumes is a proper question for the United States Government to consider and intelligently act upon. In the Bureau of Standards of the Department of Commerce our Government has an instrumentality which could be wisely used to far greater extent than it is at present in ameliorating the fire waste problem.

The first National Fire Prevention Convention, to which extended reference was made in the first article of this series in the June number of CONSTRVCTION distinctly urged that the Bureau of Standards should be requested to collect, harmonize, and systematize all existing and proposed standards covering the physical characteristics—particularly that of fire resistance—of structural materials, so that uniform standards would be available for use by cities and states in their building laws. Fortunately since 1913, when the Convention was held in Philadelphia, considerable progress has been made in the development of fire test specifications. The Bureau of Standards has been a party to this development. It established fire testing stations both at Pittsburgh and at Washington, and in order that the most effective use would be made of these facilities the Bureau organized a Conference Committee on Fire Tests of Wall Construction. This Conference Committee distinctly recognized the need of more information regarding types of construction of lesser fire-resistiveness than the heavy fire wall and the so-called fireproof partition and decided that by a series of actual fire tests a definite relationship in fire-resistive values should be determined between all types of wall and partitions now in common use. The Conference Committee also recognized the need for standardized conditions under which all fire tests should be conducted, and arranged to study a standard time-temperature curve: the standard size of panels; standard conditions of water application and the advisability or inadvisability of water application after fire exposure.

This points out a way whereby the Government could and should take a further hand in determining physical values, particularly fire-resistiveness, of structural materials and types of construction.

In the first article in the June number of CONSTRVCTION we referred to the duplication of fire tests through the frequent requirements of different cities for the conduct of special tests in each of these cities. We pointed out that this resulted in loss and hindrance to progress.

We have seen that the classification of materials and standardization of testing methods has been developed to a point where it is practically ready for National acceptance.

Here is where the Federal Government can place its facilities at the disposal of the country for the purpose of obliterating artificial hindrances to improvements in construction and materially reduce the fire loss.

We believe that the Government should be prepared to definitely answer all questions regarding the fire-resistiveness of materials or types of construction and to place this service at the disposal of the country without cost. To do this we believe the Government should place at the disposal of the Bureau of Standards funds and facilities to enable it to promptly and effectively conduct such tests. The result of each test would without question be accepted by cities or states as competent evidence of merit or demerit, and when a universal building code embodying the National plan of classification and standardization is formulated such materials or types of construction would then become automatically acceptable or unacceptable in all cities adopting such a code.

CONSTRVCTION believes that a National Building Policy should embody this feature of governmental aid in the reduction of the fire loss.

American Institute of Architects

This body embraces in its membership practically all of the best architects in the country. It, unquestionably, would be deeply interested in any proposal to establish a National Building Policy. The Institute has a general committee on materials and methods, of which Thomas Nolan, Professor of Architectural Construction in the University of Pennsylvania, is the chairman. This is divided into sub-committees assigned to each local chapter, of which there are forty, covering the territory of the whole country.

The Institute in January of this year commenced in its Journal a Structural Service Department, under the direction of D. Knickerbacker Boyd, the well-known architect and structural standardist of Philadelphia and a former secretary and vice-president of the Institute. This department aims to outline and indicate the various activities and relationships of the Government and technical societies and to say where information is obtainable on the many phases of construction.

In addition to the general committee on Materials and Methods, the Institute has committees on "Contracts and Specifications," on "Basic Building Codes" and on "Fire Prevention." The Institute is aiming to co-operate with existing technical societies. What is more logical, therefore, than that the American Institute of Architects should welcome the establishment of a National Building Policy on which and through which it could both co-ordinate its present activities in the above work and find a common ground and meeting place with all bodies and agencies interested in the great subject of improving building conditions and lessening the fire waste?

National Fire Protection Association

This Association has been a considerable factor in the development of classification of materials of construction and the grading of completed buildings in accordance with their fire resistiveness. The work of its Committee on Fire Resistive Construction has been a notable service to the country.

Through special committees, the organization studies many other phases of fire protection and fire extinguishment as applied to buildings, as, for example, automatic sprinklers, heating and ventilating systems, protection of openings in walls and partitions, use of wood in building construction, safety to life, etc.

Under the guidance of H. W. Forster, of Philadelphia, the last named committee has performed a great and beneficent work in the study of, and recommendations regarding, exits from buildings.

The National Fire Protection Association has already had a distinct part in the development, so that its entire sympathy with a logical National Building Policy is a natural expectation.

State Fire Prevention Associations

The movement to establish State Fire Prevention Associations originated with the National Fire Protection Association, and there are at the present time sixteen such bodies in that number of states, affiliated more or less directly with the mother organization.

The membership of such state associations is usually composed of the field men of the fire insurance companies, together with state and city officials. These usually meet once a month to receive addresses or to discuss live topics in the field of fire prevention.

There can be no more interesting or vitally important question for such State Fire Prevention Associations to consider and advocate than a National Building Policy, and it is greatly to be hoped that they will throw the weight of their influence to the furtherance of that idea.

American Society for Testing Materials

The value of the work of this important organization is not appreciated as fully as it should be by the country at large. The organization is, as its name implies, engaged in examining and producing standards for all kinds of materials, included in which is, of course, a vast array of structural materials. In its membership are found names of practically all the national agencies, scientific societies, companies and individuals who possess special knowledge of structural materials. The United States Government is represented in the Society through the membership of many engineers and scientists from its various bureaus and practically all colleges and universities are also represented through individual members of the faculties. The Society is, therefore, eminently well qualified, through its technical committees, to study and produce standards, and is doing in this way a great service to the country.

Among the technical committees of the Society is one known as "C-5 on Fireproofing." As pointed out in our first article, this committee has aligned itself with other national bodies in standardizing methods for conducting fire tests, and was a member of the conferences which considered a standard time-temperature curve and other fundamental factors of fire tests.

This committee had, some years ago, produced standard fire test specifications for floors and partitions. These specifications have been used quite generally in this country and Canada and have been incorporated bodily in many building codes.

The committee has made a report recommending the classifying of fire-resistive construction and materials and the standardizing of methods for conducting fire tests.

Since our first article was written the American Society for Testing Materials has held its annual meeting in Atlantic City and took significant action by adopting in its entirety as a tentative standard and ordered printed in the Proceedings the report of Committee C-5 on Fireproofing. This report follows the same plan and advocates the same principles as were contained in the report of the Committee on Fire-Resistive Construction of the National Fire Protection Association, which was adopted at its meeting in May last.

It will be remembered that the co-operation instituted by these two committees on this important subject was extended to include the United States Bureau of Standards, National Board of Fire Underwriters, Associated Factory Mutual Fire Insurance Companies and leading technical societies.

With favorable action on the work of this conference now taken by both the National Fire Protection Association and the American Society for Testing Materials, it is fully expected that the other societies which took part in the deliberations will also officially endorse the work of the conference.

Here, then, we have a striking example of the great benefit to be secured by broad co-operation among qualified institutions and persons. We believe that this co-operation, having already produced such marked results for good, is an earnest that the American Society for Testing Materials, as well as the other bodies with which it co-operated, will be definitely interested in furthering the adoption of a National Building Policy.

Organization and Relationships of Fire Underwriting Bodies

It is necessary that the relationships between the various underwriting bodies should be understood, as fire underwriting is inseparably connected with fire loss.

The National Board of Fire Underwriters is a body having in its membership the large majority of the stock companies, both American and foreign, who write fire insurance in this country. The National Board recognized years ago the need for expert scientific advice in regard to structural materials and protective devices.

Through its Committee of Buildings, of which Charles G. Smith was long chairman, it worked constantly and successfully to arouse intelligent interest throughout the country in better building practices, and began the preparation of a building code which would serve as a model for communities, large and small, that would make for fire safety and general structural improvement. The committee invited cities, towns and villages to submit their building problems to it for review, promising to give these prompt and careful attention. While this activity has added greatly to the labors of the committee, the result has been a great gain for general building practice; a condition for which the National Board, and especially the committee directed by Mr. Smith, is entitled to the highest measure of praise.

The Underwriters' Laboratories, Inc., was organized and incorporated in the year 1901 by the officials of the National Board of Fire Underwriters to supply this need for scientific advice. Having been established and since maintained by the National Board of Fire Underwriters for service and not for profit, its findings are passed upon by a Committee on Materials and Devices appointed by the National Board. The result of every test and investigation conducted by the Underwriters' Laboratories has to be submitted to this committee, and if the findings and conclusions are approved, then, and not until then, can these tests be promulgated as having the approval both of the Underwriters' Laboratories and of the National Board of Fire Underwriters.

Let us now turn our attention to the rating bureaus exercising jurisdiction in various cities, states or collection of states. These bureaus represent in their membership either fire insurance agencies located in the territory in which the jurisdiction is exercised, or, more generally, the fire insurance companies who write business in such territories. In the latter cases, which comprise the large majority, it frequently happens that the responsible officials of such rating bureaus have also been appointed, by virtue of their membership in the National Board of Fire Underwriters, to serve on the Committee on Materials and Devices in the interests of the National Board and so exercise a voting power over the findings of the Underwriters' Laboratories. Supposing, as sometimes happens, that a man who, at the same time, is a responsible official in a rating bureau and is a member of the Committee on Materials and Devices of the National Board, disapproves of some particular test or finding of the Underwriters' Laboratories, it then generally follows that this man, in the exercise of his authority in his rating bureau, prefers not to accept that finding of the Underwriters' Laboratories which has been approved by the majority of the Committee on Materials and Devices, but has received his disapproval.

The National Board of Fire Underwriters must not be held responsible for this seemingly contradictory condition. It must be borne in mind that the National Board has nothing to do with rate making, each separate rating body having supreme authority in its particular field.

It must also be remembered that there are many companies holding memberships in rating bureaus who are not affiliated with the National Board of Fire Underwriters and hence are not receptive of its suggestions or of the findings of the Underwriters' Laboratories.

It will be seen, therefore, that there is no means of compelling uniformity of practice among the rating bureaus. It is true that the findings of the Underwriters' Laboratories are usually accepted, but it is also true that in many cases its findings are rejected by individual rating bureaus.

This is one of the reasons for lack of uniformity in rating which is generally recognized as being seriously disadvantageous to the building conditions of the country. We believe that this individualistic attitude of many of the rating bureau managers would be overcome when a National Building Policy is well understood and accepted.

CONSTRVCTION believes, therefore, that the present lack of definite location of responsibility in fire insurance matters would be of far less moment if all of the different underwriting bodies were to place their seal of approval upon a National Building Policy which was understood and accepted not only by themselves, but by architects, city and state and federal authorities and by all active, interested organizations.

A further valuable activity of the National Board of Fire Underwriters is its maintainance of a staff of highly trained engineers, whose duty it is to visit cities throughout the country, studying their structural building conditions in relation to the general fire hazard, the means at hand for combating fire loss and to point out where improvement should be made, and suggest betterment of building codes, water work systems, and fire department equipment.

As a result of this work, the fire hazard in many communities has been materially reduced, while other centers that failed to heed the intelligent warnings given them by the underwriters' representatives have paid dearly for such neglect.

The work of the new Actuarial Bureau of the National Board is one of its most useful activities.

We have referred above entirely to the existing status of the stock companies and their various relationships. The mutual companies occupy a position apart from these various organizations of the stock organizations.

The late Edward Atkinson, of Boston, prior to the organization of the Underwriters' Laboratories, established a fire testing station in Boston. After Mr. Atkinson's death and after the formation of the Underwriters' Laboratories, the work of the two testing organizations was merged into the latter. There is, apart from this, a close community of interest, evidenced by exchanges of views and experiences between the National Board of Fire Underwriters and its various auxiliaries and the Associated Factory Mutual Fire Insurance Companies, to the benefit of both. The underwriting bodies do great good, but CONSTRVCTION, in pointing out the weaknesses, believes that the acceptance by the insurance bodies of a National Building Policy will overcome these defects and make the usefulness of the underwriters greater.

Schools of Architecture and Engineering

The many universities and institutes in this country having courses in architecture and engineering possess a splendid opportunity to impress upon the minds of the students, who will shortly become the designers and constructors of the country, the great importance of a National Building Policy.

If the direct benefit to be derived is impressed upon the highly receptive minds of these students, who one and all are idealists and keen for improved conditions, there would be produced a power for good in the country which will not be denied. It is greatly to be hoped and desired that the teachers of these students of architecture and engineering in our universities and colleges will make it a part of their mission to explain and advocate the National Building Policy.

Engineering and Other Technical Societies

The main reason for existence for all of such societies is to bring about improvement. There is ample evidence in the various co-operative movements which have been undertaken between different societies that they are alive to the importance of co-operative effort in effecting improvements quickly.

A National Building Policy offers a common ground for such co-operation in the great work of improving building conditions and lessening the National fire loss. The combined influence of such advocacy of a sound policy in building matters by all of the engineering and technical societies would be greatly effective, and it is, therefore, hoped that all of such societies will accept and advocate the National Building Policy.

Associations of Manufacturers

All of such associations have their own problems peculiar to the furtherance of the use of their particular materials. Beyond this consideration of individual problems each of these associations is interested in the general enlargement of the use of better structural materials, whether it be their own or others. A great increase in the consumption of fire-resistive materials or protective devices must enlarge the market for such commodities.

This view has received definite acceptance by many of the manufacturers' associations, who, therefore, are anxious to further a general movement for better structural conditions, as their own interests are distinctly involved. This, however, is not the only consideration that sways the policies of these associations, and they, like all other congregations of good citizens, are anxious for improved economic conditions and for the prevention of loss of life and property by fire, aside from their selfish interest.

In practically all cases it only needs the pointing out to such associations of a means to make this desire practically effective to enlist their approval and support. It is fully to be expected, therefore, that the various associations of manufacturers of fire-resistive materials and protective devices will approve and endorse a sound National Building Policy.

National Association of Credit Men

Alive to the economic danger to the country of an enormous annual fire loss, the National Association of Credit Men has sought to arouse especial interest on the part of its members in the subject, and has succeeded to a considerable extent in so doing. The organization, by nature of its consistently held attitude in the past, should heartily aid in developing a National Building Policy.

Chamber of Commerce of the United States of America

This important and influential body is deeply interested in the question of the fire waste of the country. It has a Committee on Fire Prevention under the chairmanship of Powell Evans, of Philadelphia. Mr. Evans is a man of broad vision and knowledge and has unselfishly devoted much time and money to the cause of fire prevention. He brought about the first National Fire Prevention Convention, held in Philadelphia in 1913, extended reference to which was made in the first article on this subject.

It is reasonable to expect that this body will view with entire sympathy and throw the weight of its great influence towards the promulgation of a sound National Building Policy.

The Chamber of Commerce of the United States has another committee, which under the chairmanship of Mr. Shaw of Chicago has done a notable service to the Government in suggesting a great number of improvements, all of which have been adopted, in the work of the bureaus of the United States Department of Commerce.

The Chamber is also working in close accord with the National Government through its Committee on Co-operation with the Council of National Defense.

The whole history of this important body is one of effective service to the country.

Chambers of Commerce and Boards of Trade of Different Cities

There are many such bodies, almost all of whom are members of the Chamber of Commerce of the United States of America. In their own cities these bodies are continually striving for the betterment of local conditions. A typical instance of this public service is the Chamber of Commerce of Rochester, N. Y., which has been most active and successful in bringing about improved conditions in that city.

The combined support of a National Building Policy by all the Boards of Trade and Chambers of Commerce in the country would be highly effective.

Fire Marshals' and Fire Chiefs' Associations

It would be hard to find a body of public officials more definitely devoted to the public good than state fire marshals and city fire chiefs.

These men have to consider intimately the hazards of conflagrations and the causes of fires and means for preventing and extinguishing same.

Their problem could be made far more simple if, through the means of a National Building Policy, conflagration hazards were eliminated and incipient fires were automatically controlled. It is wholly logical that the fire marshals and fire chiefs of our country should advocate such a sound National Building Policy.

Building Departments and Officials of States and Cities

These men, primarily charged with the administra- of laws, are frequently effective instruments in bringing about improvements of building laws and conditions.

The National Building Policy should be the accumulation of the fundamentals of good practice in relation to the construction and protection of buildings and would furnish to these officials tremendous inspiration and aid in bringing about the improvement of building laws in their own jurisdictions which they desire.

We have described some of the existing activities and it will now be apparent that our country possesses the instruments for putting a National Building Policy into effect. If all of those mentioned were to endorse and work for the same policy then its acceptance and full use by the country would be hastened. Its adoption is assured in any event in the long run and CONSTRVCTION is anxious for results to come quickly and to this end seeks the sympathy and co-operation of the activities named.

(To be concluded in next issue)

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Approves National Building Policy Idea

EMPHATIC approval of the article appearing in the June issue of CONSTRVCTION urging that the time was opportune for the adoption of a National Building Policy has been given by a number of competent authorities in various parts of the country.

We are especially pleased with the comment had from Thomas Nolan, F. A. I. A., Professor of Architectural Construction of the University of Pennsylvania, and one of the foremost members of the American Institute of Architects.

Professor Nolan's letter follows:

Philadelphia, July 28, 1917.

"Editor CONSTRVCTION—

"I have read with much interest in CONSTRVCTION the articles relating to the subject of "A National Building Policy." Of course this is a matter which is of special interest to the architectural profession. I do not see why the adoption of such a policy cannot be brought about without in any way discriminating against any material or building interest, and why it cannot be entirely free from any political, commercial or selfish interests.

"While I cannot speak officially for the American Institute of Architects, I would like to express the opinion, as chairman of the Institute Committee on Materials and Methods, that the general acceptance of a National Building Policy, if properly formulated, will sooner or later become a fact; and I hope that among the prominent agencies which will assist in bringing this about will be the American Institute of Architects, and also the architectural and engineering departments of our universities. I refer to these especially, among the agencies which may be helpful in this work, as I am especially interested in both.

Yours very truly,

THOMAS NOLAN,

Chairman of the Committee on Materials and Methods, American Institute of Architects.

Fire Tests of Doors and Windows at Underwriters' Laboratories

By M. L. Carr

FIRE tests of doors and windows at Underwriters' Laboratories are made by exposing one side, usually the side away from the wall in the case of doors and the weather side in the case of windows, to the action of fire in order to determine their flammability, their values as barriers to flames and heat and their stability under fire conditions.

Apparatus and Methods

The tests are made in a furnace designed especially for testing walls, partitions and devices intended for the protection of window and door openings, the appearance of which is shown by Figure 2. Briefly described, it consists of a brick combustion chamber, one side of which is closed by a movable wall in which the sample to be tested is installed as it would be in actual practice. The movable wall is of such size as to provide for a door or window opening about 11 feet wide by 13 feet high, maximum dimensions for the reception of test samples. The size of the opening available depends to some extent upon the degree of restraint required against expansion of the test specimen

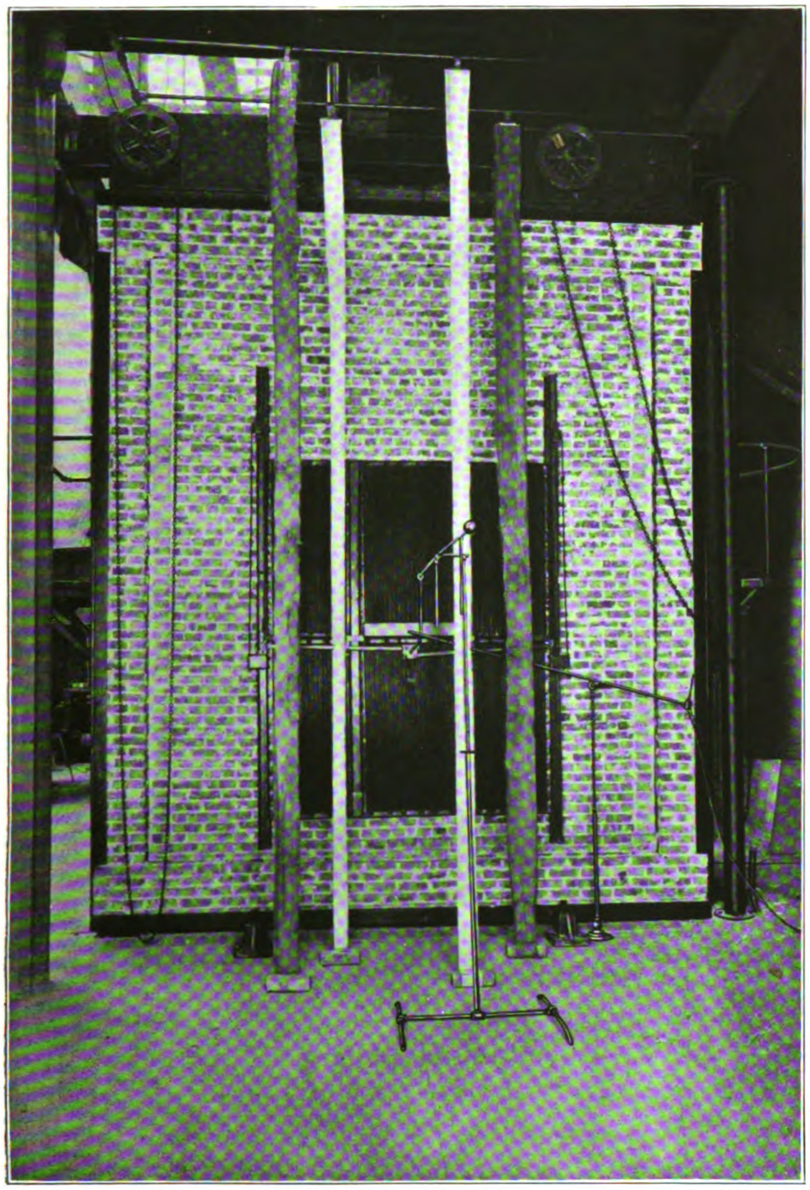

Fig. 2. Panel Testing Furnace. Counter-balanced elevator door installed in panel preparatory to test, with typical arrangement of cloth strips, thermo-couples and thermometers for indicating amount of heat transmitted and radiated during test.

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* Reprinted by courtesy Underwriters' Laboratories and National Fire Protection Association.

and upon the nature of the construction required by the device at the edges of the wall opening.

The furnace is heated by large burners fed from city gas mains and supplied with air from a motor-driven blower, suitable valves being provided for regulating the intensity and distribution of the fire. The temperature of the fire is measured with thermo-couples at a number of points distributed over the face of the test sample and about six inches therefrom, fifteen couples being employed in connection with the largest doors or windows.

The temperature of the air on the side opposite the fire is measured at a point in contact with the sample and at points 32, 64, 96 and 128 inches from its center in all tests, and in some tests at points approximately 20 and 30 feet distant. Cloth strips located 32, 64, 96 and 128 inches away are also used to indicate roughly the amount of heat given off.

Standard Fire Tests

The Laboratories' standard test for a fire door or window is of one hour duration with the average furnace temperatures regulated so as to conform as nearly as possible to a standard time-temperature curve which provides for a temperature of 1,550 degrees F. 30 minutes after the starting of the test and for 1,700 degrees F. 60 minutes thereafter.

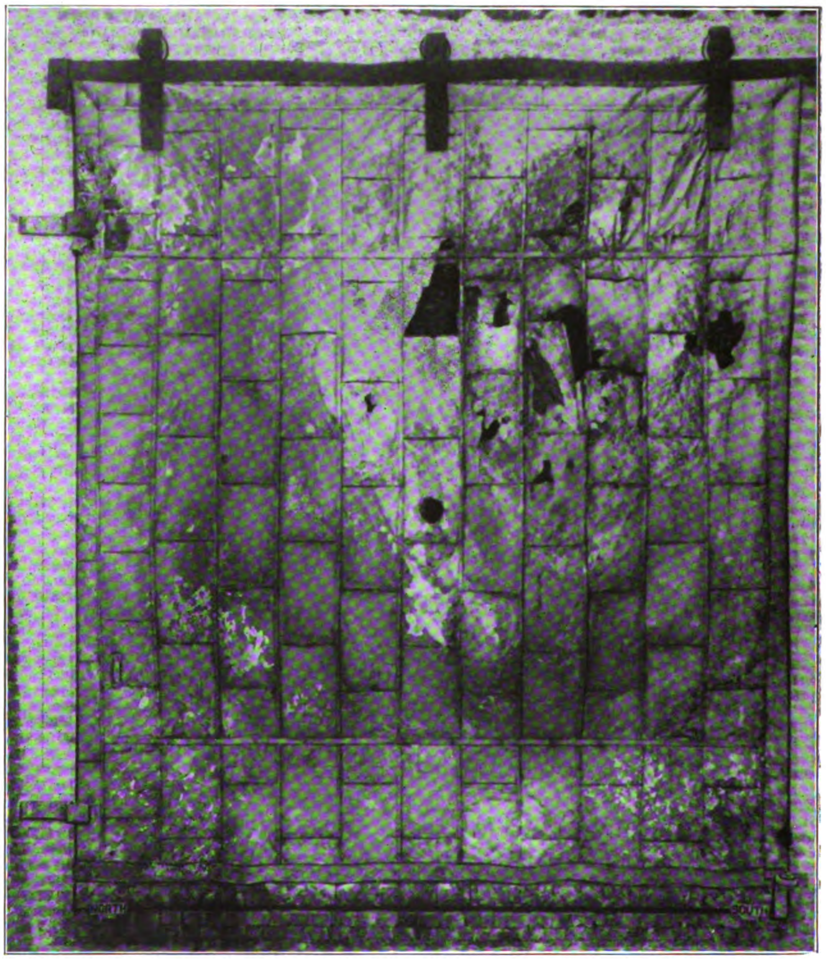
At the end of the fire test the sample is usually subjected to the action of a 7/8-inch fire stream applied from a distance of 20 feet at a pressure of 60 pounds for a length of time determined on the basis of one minute for a 5 by 7-foot sample.

In response to a growing demand for larger fire doors on account of the needs of modern business conditions and to the increasing insistence of health and other authorities upon better provisions for light and ventilation, a considerable number of devices designed to meet such requirements, and at the same time to provide for the requirements of fire protection, have been tested within the past year. Among the more interesting are: A test of a large tin-clad door, a test of a large sheet metal fire door, and tests of several large fire windows. In general, it can be said that all of the tests here briefly described yielded better results than were anticipated.

Tin-Clad Fire Door

A 2½-inch standard tin-clad sliding fire door for a wall opening 10 feet wide by 12 feet high was tested with results not materially different from those noted

Fig. 3. Tin-Clad Door. Fire side of 2½-inch 3-ply door after exposure to standard fire test conditions for one hour. A fire stream was not applied to this test sample.



in other tests of similar doors for openings 5 feet wide by 8 feet high. The test showed that it is advisable to provide additional vents and chafing strips in order to reduce bulging of the tin covering, and for at least three binders. The appearance of the door after the test may be seen by reference to Fig. 3.

Sheet Metal Fire Doors

One test of a sheet metal fire door for an opening 10 feet wide by 11 feet high has been made with results similar to those obtained in tests of smaller doors of the same kind, but, owing to the fact that official action with respect to reporting upon and listing it has not been taken, it is not permissible to publish details at the present time. Another test to be made soon is of two sheet metal fire doors installed with one door on each side of the wall opening. Each door is to be provided with a wicket door designed to comply with certain State requirements regarding exit facilities. The appearance of the sheet metal door tested is shown by Fig. 4.

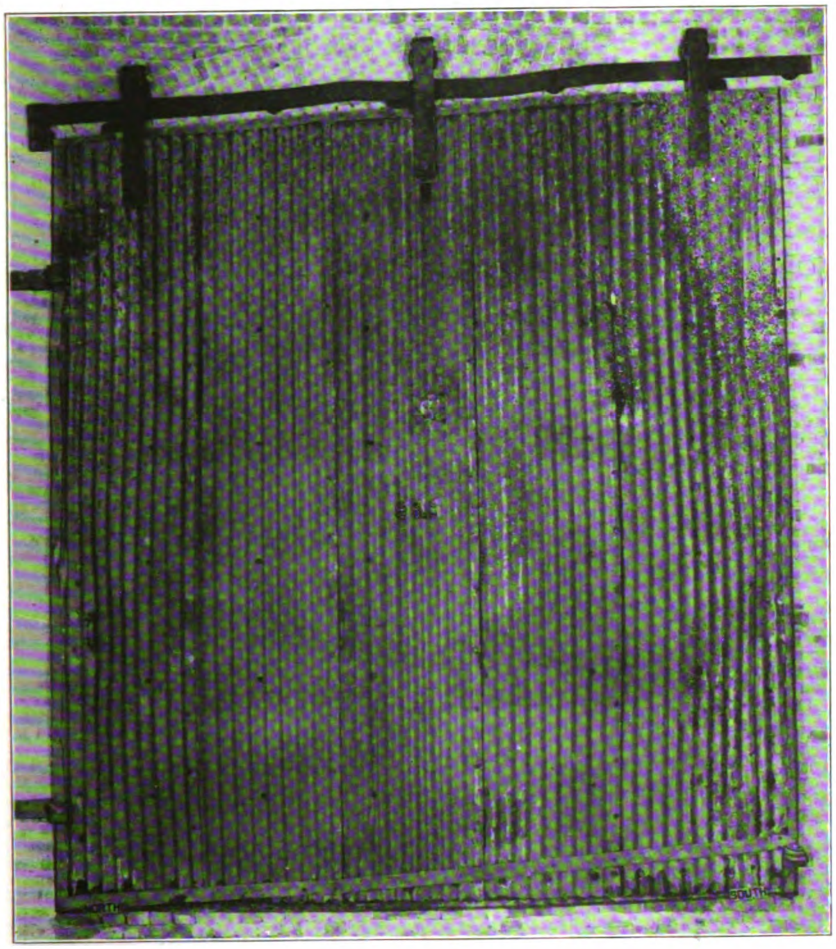


Fig. 4. Sheet Metal Fire Door. Fire side of sheet metal door after exposure to standard fire test conditions for one hour and to standard fire stream test for two minutes.

Windows

Up to the present time several tests have been made upon wired glass windows of the solid section pattern, Fig. 5, in sizes ranging from 9 to 10 feet in width by 9 to 12 feet in height. Each window consisted of two window units with a non-loadbearing steel mullion between them.

One test has been made upon a wired glass window of the hollow metal pattern for a wall opening 10 feet wide by 12 feet high, Fig. 6. The window consisted of two window units each approximately 5 feet wide by 12 feet high, with a non-bearing steel sheet metal mullion between them.

In general, it can be said that the tests have shown that properly constructed wired glass windows of large size of either pattern are equally as efficient as smaller 5 by 7-foot windows tested heretofore as barriers to flame, but that owing to the larger areas involved, the amount of heat transmitted will be greater for similar conditions of fire exposure.

Developments in Fire Windows

While very little of the details may be given out at the present time, it can be said that considerable progress has been made along two lines in the further development of fire windows. This work is being prosecuted at the laboratories for The National Association of Manufacturers of Hollow Metal Windows.

One of the lines mentioned is a window with smaller lights and narrower muntins, the sizes of the lights being properly proportioned to depths of the grooves

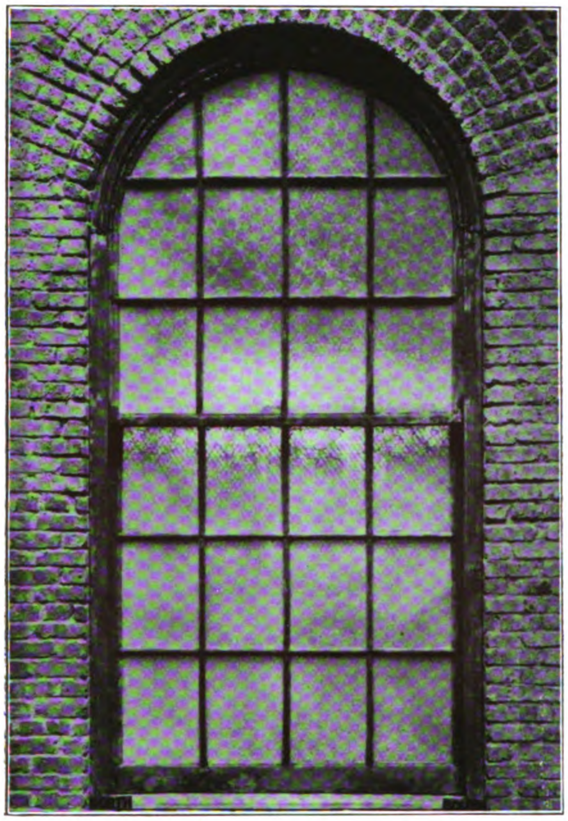


Fig. 7. Experimental Sample. Wired glass window, with 12- by 17-inch lights, after exposure to fire for one hour with furnace temperatures rising gradually to 1,700 degs. F. and to standard fire stream test

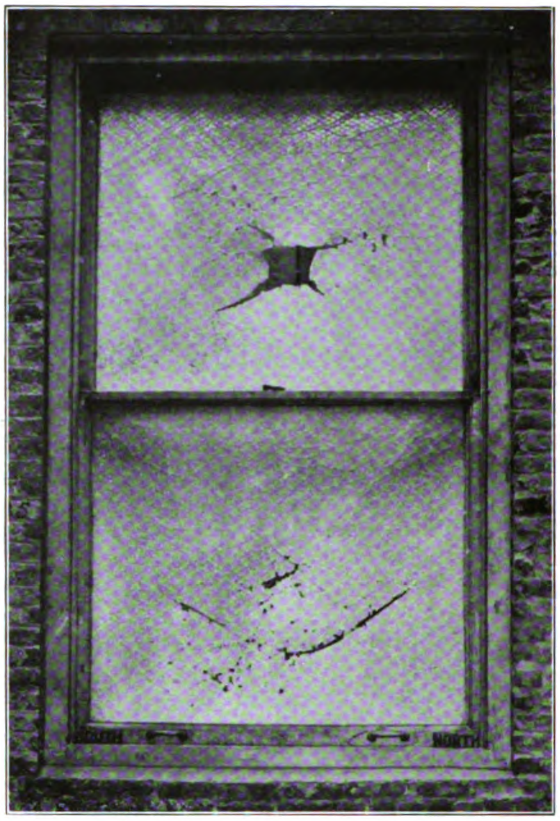
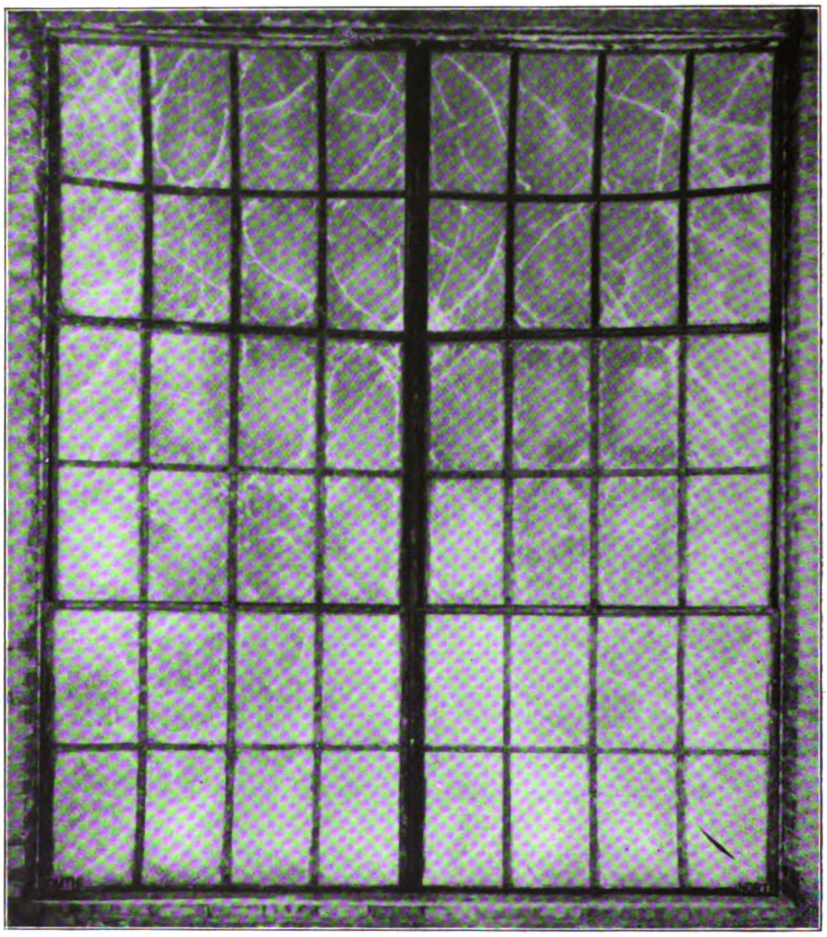


Fig. 8. Experimental Sample. Wired glass window, with 43- by 51-inch lights, after exposure to fire for one hour with furnace temperature rising slowly to 1,200 degs. F. and to stand fire stream test

Fig. 5. Solid Section Fire Window. After exposure to fire for one hour with furnace temperatures rising gradually to 1,700 degs. F. and to standard fire stream test. The wall opening was 10 feet wide by 12 feet high.



retaining them. Up to the present time practically all hollow metal windows have been provided with grooves ¾-inch deep. While ¾-inch depth of groove makes permissible lights of 720 square inches area, there are many situations where for architectural reasons smaller lights and narrower muntins are desired. One test has been made recently of a window of this kind with good results, considered from a fire protection viewpoint, as may be seen by Fig. 7.

The other type of window undergoing development is designed for use in situations subject to light fire exposure, such as across wide streets or from other windows in the same building. The end sought is to produce a non-combustible window of sufficient fire-retardant value for such uses, in which it will be permissible to employ lights of wired glass exceeding 720 square inches in area. The association hopes to be able to produce a window that will have all of the desirable features of wooden windows without the objectionable ones of being ignitible by radiant heat or by flames issuing from other windows in the same building. The progress of the work to date has been encouraging. Fig. 8 shows a window that was subjected to fire for one hour, the furnace temperatures being increased gradually to 1,200 degrees F. (instead of to 1,700 degrees F., as in tests of windows for more severe exposures) by the end of the test period. It was subjected to the standard fire stream tests for one minute immediately following the fire test. The holes in the central portions of the light were produced by the impact of the stream.

It is estimated that about five hundred tests of fire doors and windows of all types and patterns have been made at Underwriters' Laboratories. The great majority of these tests were made at the request of individual manufacturers, but recently co-operative testing has been coming into favor—the manufacturers in an industry with common problems joining in the conduct of a relatively few tests of representative constructions, so designed as to develop principles of design rather than the merit of particular devices. This method of procedure possesses the advantages of making for a better understanding on the part of the laboratories and of the manufacturers of each other's problems and for a more efficient co-operation, as well as a saving in time and expense.

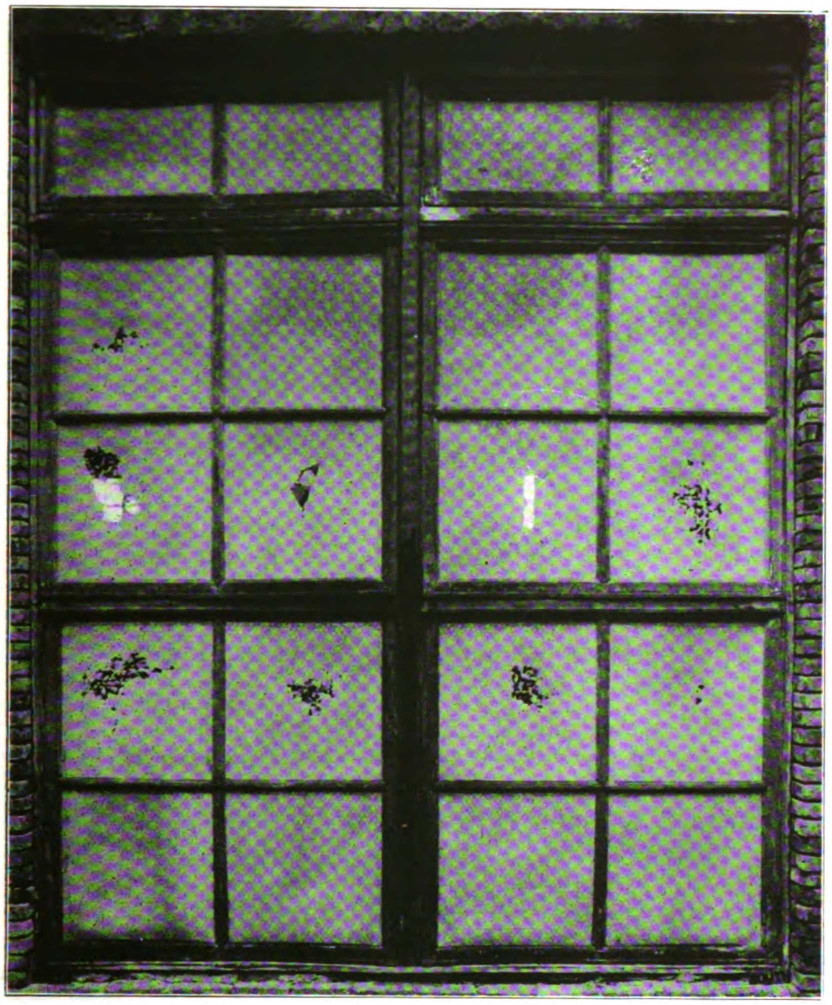


Fig. 6. Hollow Metal Fire Window. After exposure to fire for one hour with furnace temperatures rising gradually to 1,700 degs. F. and to standard fire stream test.

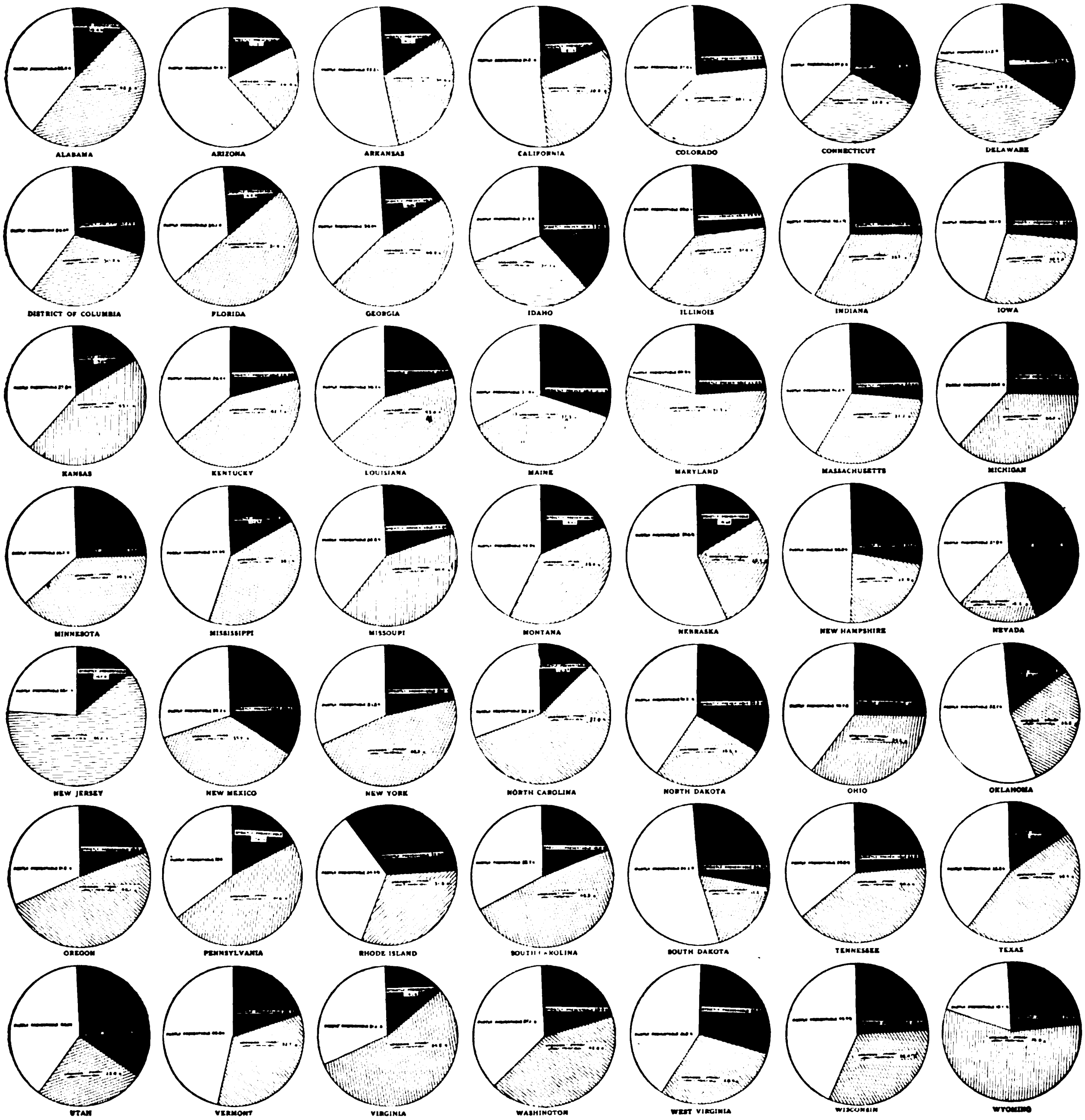
Most Fires Are Preventable

CAPTIONED as above, the National Board of Fire Underwriters a short time ago issued a chart showing in graphic form the fire causes of each State in the Union, based upon the returns for the year 1915.

The aggregate loss for each Commonwealth was classified by the Actuarial Bureau of the Board into three broad divisions called, respectively, "partly preventable," "strictly preventable" and of "unknown origin," though probably preventable in the larger part.

Taking the United States as a whole, 21.4 per cent of the fires in the period named were strictly preventable, while 37.9 per cent were "unknown" as to their origin.

Through the courtesy of the National Board we reproduce above its highly interesting chart, and commend its careful study by all who are or who should



Graphic chart issued by National Board of Fire Underwriters, showing causes of fire loss in each state of the Union

(*Continued on page* 33)

*Fire Retardant Windows**

By S. H. Pomeroy

(Continued from last month)

THE great obstacle which window manufacturers formerly encountered—the great obstacle that delayed progress in window making—was the apathy (I had almost said ignorance) of the architects and engineers and owners having to do with the specification and purchase of fire retardant windows. To these benighted dwellers in darkness, all Label windows (like the proverbial Ethiopian) looked alike. So long as the Underwriters' Laboratory had taken responsibility for fire retardant quality, why worry about the merely incidental features of window quality?

And—be it sadly confessed—most window manufacturers acquiesced in this apathetic state of affairs, and made windows no better than they need be, to "get by." A few, however, had broader visions of window efficiency. And to-day manufacturers can furnish windows just as good as architects and engineers and owners are willing to pay for. And architects and engineers and owners are more and more recognizing the fact that there are degrees of quality in fire retardant windows as in other items of building equipment.

Importance of Window Question

Since the vast majority of buildings fitted with fire retardant windows are built for rental purposes—and since the building as a whole is designed and built with a view to its rentability—it is a singular thing that the importance which attaches to good windows as rental factors is so generally ignored. Or, I should say, it would be a singular thing if we were not "wise" to the speculative element that enters so largely into building construction.

The man, or the concern, putting up a building to sell, too often seeks that combination of architect and contractor that will furnish the maximum floor area or the maximum cubage at the minimum of cost—and get by the Building Department with it. What does he care whether the windows work hard—or are ill fitting—or let in all out-doors—or let out all the heat—so long as the building and insurance authorities say those windows are good enough?

It is the (more or less) innocent buyer of that speculative building, and his ill-starred tenants, who must bear the brunt of this window folly which grows out of this indifference to the various grades of window quality. When the tenants complain of the difficulty of opening and closing the windows, or of the all-pervading dust that comes in even with the windows closed, or of the impossibility of keeping warm (due to the leakage of cold air around the windows), then the building owner or operator will begin to realize that there is such a thing as window efficiency.

When he sees his coal bills mounting to outrageous heights in the effort to keep a cold building warm, then window efficiency begins to take tangible form. When he is told that his only salvation is in weather-stripping his windows—at a figure that is never low—then window efficiency becomes more tangible. And when tenants begin to move to more comfortable buildings with windows that are comfortable and livable, then window efficiency looms as a big factor in rental values.

An Expensive Policy

I cannot resist the temptation here to pay my respects to the practice of weather-stripping. It is, beyond question, useful as a corrective to bad conditions already existing. But no greater mistake can be made than to install cheap or inefficient windows with the idea of weather-stripping them later. The fact is that the cost of a cheap window plus the cost of any effective weather strip is greater than the cost of a good window that will not need weather-stripping.

The joker lies here—the original builder or owner will have to pay only for the cheap or inefficient windows. The burden of weather-stripping will come upon those who follow after—even unto the third and fourth generation—for weather-stripping is not time-proof and must be replaced. Here again we see the evil effects of speculative building and of the "don't care" spirit it has engendered.

Let us, at this point, give a little further thought to the effect of window efficiency on the rental value of a building. For, of course, the ideal of every landlord is to keep his building filled with contented tenants, and to keep down the expense of operating and maintaining his building. Window efficiency is a big factor in all this, which architect or engineer is expected to consider in the plans and specifications.

As contributing to the contentment of tenants—which is one of the potent factors in making them long-time tenants—consider what we may call the "comfort capacity" of the windows. This covers: easy manipulation and freedom of opening and closing; silence, as contrasted with the rattle and squeak of poor construction; comparative dust-tightness, as contributing to cleanliness inside; comparative weather-tightness, as preventing coldness and draughts.

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* Address delivered before recent gathering of New York Chapter of the National Fire Prevention Association.

Tenants appreciate these good qualities—are willing to pay for them—and will go where they can be had.

As contributing to lowered operating cost of a building, window efficiency must be considered in its relation to the fuel bill for heating. The radiator equipment of a building should bear an intelligent relation to the fenestration of that building—the size and disposition of the windows. And the heating engineer provides radiation based upon good weather qualities in the windows. In other words, he assumes that the windows will keep out the cold and keep in the heat; and if they fail to do so, his calculations all go astray and the heating plant proves inadequate, requiring the constant forcing which leads to an excessive fuel consumption. Windows of high weathering efficiency will minimize the heating bill.

Economy in the Long Run

In the up-keep cost against a building must be charged the expense of keeping the windows in good working order—silent, easy-operating, with good weather qualities. A slightly higher initial price paid for high-class windows will return handsome dividends in lower window maintenance cost.

Now, of course all this doesn't appeal for a moment to the man who is putting up a building for as little as he can to sell for as much as he may. But it means a lot to the man who buys that building with a view to its earning power—and to the man who puts up a building of his own that he means to retain as a good investment.

At some not-far-distant day, this idea of true window efficiency is going to take firm root in the minds of architects and contractors and owners. Then—when a building is offered for sale—one of the deciding factors will be the character of the window work. Until this time comes, however, we who are standing as exponents of high-efficiency windows can only preach our doctrine broadcast, showing by precept and example that there is no more conspicuous instance of false building economy than the installation of cheap windows, no folly in building operations greater than the window folly which fails to recognize the fact that windows should—and can—have a life equal to the life of the building of which they are a part.

Messrs. Hardy and Chapman, in their admirable paper, placed fire hazards in three general classes: first, internal fires; second, fires due to local exposures; third, conflagrations. Under all three of these hazards, I unhesitatingly put the high-grade hollow metal window with wire glass as the most effective and efficient fire retardant that can be used.

I need not here go into any discussion of the merits of this window in relation to the first two classes of hazard. Its value and effectiveness in confining internal fires and in excluding exposure fires have been repeatedly demonstrated in the tests of actual experience. The third hazard, however—the conflagration risk—deserves some reference at this point.

Every conflagration of recent years has proved that an ordinary street is no barrier in the sweep of flame. Yet architects and builders continue to leave their street front windows unprotected, while equipping their side and rear openings—local exposures—with fire retardant windows. Here also is an instance of window folly that cannot be too strongly condemned.

And the question of street front window protection enters largely into the problem of internal fire hazards also. For what shall it profit a man to have fire retardant windows on sides and rear of his building, if an internal fire can leap from floor to floor through his unprotected street front windows?

Of course, the great obstacle to the use of fire retardant windows for street exposures is the objection to wire glass in street front windows. And here is a fine instance of unfounded prejudice. For, from the street level, polished wire glass cannot be distinguished from polished plate glass—in no wise detracts from the appearance of the building. And, from the viewpoint of the man inside, polished wire glass is no more intolerable in street front windows than in side and rear windows.

Further, the hollow metal fire retardant window has been taboo on street fronts because of its unattractive appearance. This objection is now overcome by the introduction of very high-grade hollow metal windows especially designed for street fronts, and put out in steel, in copper and in bronze—worthy of a place in the most beautiful and most dignified building elevation.

Although it is a little aside from the subject of windows, I want to direct your attention for a moment to another factor in minimizing the internal fire hazard. The object of hollow metal wire glass windows and metal-mounted wire glass stair and elevator enclosures is to confine a fire to the story in which it originates. But it may still sweep throughout that story.

Division of Floor Space

A further step toward internal fire safety, without the sacrifice of light and air, is the sub-division of a floor into space units by means of hollow metal wire glass partitions. These will confine a fire to the space unit in which it originates; at the same time eliminating combustible materials used in ordinary partitions. The doors and movable transoms in these partitions can be fitted with automatic closing devices, so that easy intercourse and free ventilation are in no wise impaired by this system of sub-division.

A fire-proof building, with wire-glass enclosed elevator and stair wells, with hollow metal wire glass windows on all sides and all floors, and with floors sub-divided by hollow metal wire glass partitions, will give the nearest possible approach to that ideal fire risk of the underwriters—pig iron under water.

I can think of no better thought with which to close this paper than the following, quoted bodily from an excellent article on "Protecting Building Exteriors" in the May (1916) issue of "Constrvction":

"From the standpoint of those who purchase structural materials, cost can no longer be defined as the amount of money paid for a material or device. We build our buildings for permanency; our office buildings, hotels, warehouse and mercantile structures are erected with the idea that they will stand for many years and give good service; therefore the real cost is the ultimate cost and can better be defined as the total expense of the installation and maintenance of materials and devices plus or minus the insurance credit or penalty granted or imposed for the use of the product in question. In other words, in the consideration of the protection against exposures various questions of cost versus ultimate cost must be decided. For instance, window frames and sash of solid or hollow steel have a far higher degree of permanency and necessitate a much lower cost of maintenance than those of metal-covered wood, at the same time offering far greater safety. It is false economy to let the lower first cost of metal-covered wood windows influence the builder to install this type, or wooden windows or metal windows of inferior design and workmanship—it is false economy to use plain glass where wire glass should be used, even though the risk seems slight, or tin-clad doors when all metal doors may be obtained at a slight increase in price. Buy with the sure knowledge that safety and permanency are the cheapest in the end."

Most Fires Are Preventable

(*Continued from page* 30)

be interested in checking the drain placed upon the economies of this country through the vast annual destruction of property values, to say nothing of the loss of human lives, by needless fires.

To North Carolina belongs the credit for having the lowest percentage of strictly preventable fires, its ratio in this respect being 12.8. The poorest showing, on the other hand, is made by Nevada, its percentage being 43.9.

Alphabetically arranged the ratio of strictly preventable fires in each of the States is as here given:

Alabama, 13; Arizona, 17.8; Arkansas, 16.2; California, 18.7; Colorado, 23.5; Connecticut, 32.3; Delaware, 34.0; District of Columbia, 29.9; Florida, 14.5; Georgia, 16.9; Idaho, 38.0; Illinois, 23.4; Indiana, 24.8; Iowa, 26.5; Kansas, 17.0; Kentucky, 20.9; Louisiana, 20.8; Maine, 31.1; Maryland, 23.8; Massachusetts, 26.6; Michigan, 23.9; Minnesota, 25.0; Mississippi, 17.3; Missouri, 20.8; Montana, 18.4; Nebraska, 16.6; New Hampshire, 27.8; Nevada, 43.9; New Jersey, 14.7; New Mexico, 34.1; New York, 21.7; North Carolina, 12.8; North Dakota, 33.2; Ohio, 25.1; Oklahoma, 16.1; Oregon, 19.3; Pennsylvania, 17.4; Rhode Island, 33.9; South Carolina, 19.0; South Dakota, 28.6; Tennessee, 23.9; Texas, 16.0; Utah, 35.0; Vermont, 20.7; Virginia, 14.1; Washington, 20.9; West Virginia, 28.8; Wisconsin, 24.2; Wyoming, 24.0.

Simplifying Text Work

TO prevent duplication of effort the Bureau of Standards will hereafter take over the work formerly conducted in the laboratories of the Reclamation Service at Denver and at San Francisco.

The Bureau of Standards will make tests and analysis of concrete and concrete aggregates and other tests required by the Reclamation Service, which latter in turn will turn over its laboratory staffs and facilities to the former organization.

Conserving Steel for Government Use

UNDER date of July 21st the Illinois Society of Architects wired the National Council of Defense at Washington, D. C., as follows:

"We suggest that the Council of National Defense advise the architects and builders of the country to refrain from constructing steel and reinforced concrete buildings and to revert to the old standard of building construction; that is, brick and mill constructed buildings wherever practicable, in order that the steel of the country may be conserved for Governmental needs. We believe it to be the patriotic duty of architects and builders to use a minimum of steel in these trying times."

Ways and Means of Providing Workingmen's Houses

Perry H. Mac Neil in "The American Cities"

IF a banker is asked to loan money for any enterprise of recognized safety, the interest return governs his decision and not the benefit the enterprise may be to the community. It is this same attitude that the manufacturer, the merchant or the real estate man is apt to bring to any civic improvement whose benefits are indirect. Hence it is not surprising that when any group of enlightened men seek to provide adequate houses in their community they should fail to receive the co-operation from all the citizens that is indispensable to complete success.

It is a case of sink or swim together. The banker must facilitate the placing of the first mortgage, and having insured the proper safeguards must make the money available at a low rate of interest. The manufacturer must be willing to take a certain risk the banker cannot take, and must supply the bulk of the equity, for he benefits more directly than anyone else in having adequate housing for his labor. The merchant must contribute for the direct benefit he gets from an increased population; lack of proper houses keep people from a town. He should also contribute from a sense of civic obligation to a town from which he is taking, bnt to which, in a sense, he is not giving.

The manufacturer gives to the town in providing employment for large numbers of men who are the customers and profit-producers for the merchant, so that while the manufacturer should bear the greater part of the burden of providing the necessary funds the merchant should render material help. Lastly, the real estate man must put his shoulder unselfishly to the wheel, for anything which benefits the town benefits him directly.

Taking First Action

The first action that is necessary, therefore, for any community wishing to provide homes for its people is to educate the public mind to the advantages of having and the disadvantages of not having adequate houses. This can be done by holding meetings or noonday luncheons which representative and influential men will attend. At such a meeting there should be an address by some housing expert and an opportunity given to ask questions.

These meetings should be limited in number. If a proper newspaper campaign can be conducted in advance, one meeting should be sufficient, and at its close a committee should be appointed with power to employ expert advice, to take options on land and to present to the public a definite plan showing the houses proposed to be built, their cost and the prices at which they will be rented and sold.

When this is done, the decks are cleared for the crucial action in the entire undertaking—the raising of the money that is necessary over and above a first mortgage.

Raising the Money

This cannot be done successfully by soliciting money on the basis of an attractive financial return. Where such a return is possible, the houses will build themselves. Energetic and shrewd men are now operating along these profitable lines in every part of the country. If conditions are inviting, there is no need to search for these men; they will search out the place and will build just as many houses, and build them just as fast, as the public will buy from them at an attractive profit.

It is not these houses that need the help and support of community action, but the houses that from their very unprofitableness are desperately needed and are never built except with the aid of a helping hand. Without the unprofitable houses there will surely follow room overcrowding, with increased sickness and death in its wake. Immorality and crime are close seconds. Overloaded poorhouses, overloaded asylums and overloaded jails are the penalties for any city which permits slum conditions to prevail.

The appeal for money must, therefore, be made as a civic necessity—a whirlwind campaign, if you like, conducted by professionals and with clock dials daily marking the thousands raised. Or the campaign can be a quiet one directed toward the men of vision and of means in the community.

The manufacturers can be shown the saving in their "turn-over" that adequate houses will effect. During the last year the turn-over in the majority of industries has probably exceeded 300 per cent. That is, for every man kept steadily employed during the year three men were employed. The cost of breaking in a new man runs anywhere from $25 upward, so that to break in three men would cost at least $75. If this amount is capitalized at 5 per cent, it amounts to $1,500, or almost enough to provide a house for a man and his family. In the majority of cases the loss of workingmen is due to lack of houses; hence the business necessity for the manufacturer to provide adequate houses.

(To be concluded next month)

A Department Devoted to the Use of

AUTOMATIC SPRINKLERS

Edited
IRA G. HOAGLAND, Secretary PAUL MASON, Special Representative
National Automatic Sprinkler Association

Structural Causes of Unsatisfactory Control of Fire by Sprinklers

CONSTRUCTION features constitute such an important factor in sprinkler efficiency that the National Fire Protection Association, in its annual tabulation of sprinkler efficiency by occupancies, lists two causes of unsatisfactory control of fire that are purely structural—due to defects in construction. Unsatisfactory control is found under 97 of the 138 occupancies listed, or 70.15 per cent; and as these two structural causes appear under 68 occupancy classifications, or 70.1 per cent of the 97, it is very clear that defects of construction are responsible, wholly or in part, for 49.18 per cent of all cases of unsatisfactory control of fire by automatic sprinklers. The other 50.82 per cent are distributed among 10 causes, including "miscellaneous" and "not classified."

"Unsprinklered portions," grouped with "defective equipment," figure under 62 occupancy classes, or 63.9 per cent, and "concealed spaces, vertical openings," etc., under 22 classifications, or 22.7 per cent, while the two in combination are found in 17 occupancy classes, or 17.5 per cent.

Considered with respect to the number of fires affected by these causes of unsatisfactory control, it is seen that under the first heading there were 196—exceeded only by "water shut off," with 230, in the entire list—and 38 under the second, an aggregate of 234 out of a total of 851 fires in 20 years in which sprinkler control was not satisfactory, or 27.5 per cent.

Of these 234 fires thus listed under two causes of unsatisfactory control, 135, *or* 75.7 *per cent, are found under the* 17 *occupancy classes in which both causes were operative.*

These records emphasize the necessity for structural completeness and perfection of construction methods. The unsprinklered portion should be anathema, the concealed space is an abomination and unprotected vertical openings are a pressing invitation for fire to enter. For example, the following instances from the National Fire Protection Association's Fire Record illustrate forcefully the menace of these structural defects:

Paid Penalty for Faulty Construction

"*S:* 16691—*Sawmill.* Fire started at 4:15 A. M. from unknown cause in the hopper of a sawdust collector and spread rapidly to the open, frame, unsprinklered light lumber storage sheds which adjoined, and communicated with the two-story frame sprinklered mill building and piles of lumber in the yard.

"The sprinkler system had two sources of supply and all valves in the supply line were open, but the fire gained such headway in the unsprinklered portions that the sprinklers were unable to control it when flames invaded the main building.

"*S:* 17791—*Metal Worker.* This fire occurred in peak of roof, in concealed joist channels of building occupied for finishing and wrapping coffee grinders. Roof was slate covered on boards on joists, with sheathing under the peak. Prompt action by fire department limited the damage. There were no heads in this concealed space, and water from the one head which opened was unable to reach the seat of the flames.

"*S:* 15909—*Box Factory.* Fire occurred in three-story frame, open-joisted factory, 120 by 90 feet, occupied mainly by wood and paper box factory. In one corner of first story was located waste paper baling room, 25 by 20 feet, cut off from main room by ⅞-inch wood partition that extended up to bottom of joists, leaving joist channels open between the areas. Doorway was open.

"Frame chute, 26 by 24 inches, extended down from third floor into baling room; upper end of chute open, lower end operated by a trap, which was open at time of fire.

"Blaze started in baling room from unknown cause and spread rapidly up the chute and through the third floor and also through joist channels into main room on first floor.

"Spread was too rapid for sprinklers, though about 90 per cent opened and retarded it considerably, but it burned into second floor from both above and below, and when roof collapsed sprinkler system was put out of commission."

Danger of Unprotected Openings

This last is a very striking instance of the hazard of an unprotected vertical opening. If there had been a sprinkler at the head of the chute the building probably would have been saved. Only a month ago fire developed at the foot of an elevator shaft in one of the biggest department stores in Columbus (Ohio)—a veritable firetrap—but there was a sprinkler at the head of the shaft, it operated promptly and the fire was extinguished with loss of less than $25.

Battalion Chief John A. Welsh, who handled the fire, told the Ohio Firemen's Convention at Springfield that if the elevator shaft had not been protected in this manner the loss probably would have exceeded $500,000.

The contrast between this instance and the preceding citation needs no elaboration to impress the lesson on the thoughtful building owner, occupant or builder.

These faults are easily remedied and as a rule do not involve heavy expense. They exist, most commonly, because their importance is not realized and they are overlooked. In this day of conservation of life and property—especially life and foodstuffs—for war purposes, they come into clearer perspective, and everyone having to do with the problems involved should emphasize their vital nature and direct bearing in support of the nation at war.

Urged to Study Fire Prevention

"THERE never was a time more opportune for the propagation of fire prevention than the present," was the statement made by the Insurance Committee of the Canadian Manufacturers' Association in the course of its recently presented annual report to the organization.

Emphasizing the importance of studying more attentively the question of fire prevention, the committee further holds:

" It must be apparent, even to the person of not only ordinary intelligence who studies the problem, that a large proportion of the fires that occur in this country could and would have been prevented had proper precautions been taken to guard against them. One of the most effective methods, which is at the present time easiest of application, is to have all premises properly and regularly inspected, preferably by trained firemen in uniform, with some authority behind them that could compel the correction of dangerous defects and the removal of unnecessary hazards. The work of fire prevention is of such importance that our municipalities would be fully justified in seeing that their firemen were specially trained for it by competent instruction and encouraged to make it a life work having the status of a profession. Upon the principle that an ounce of prevention is worth a pound of cure, our municipalities should be paying much more attention to fire prevention than to fire extinguishment, yet in the vast majority of cases proficiency in the latter is the only thing that counts. The installation of heating apparatus should be safeguarded by strict regulations. Every winter we read of schools and other buildings that are destroyed by fire said to have been caused by an overheated furnace. Furnaces can be installed in such a way that there is practically no possibility of overheating. There should be similar regulations covering electric wiring and other electrical installation, and all such equipment should be regularly inspected by men clothed with power to order it to be put in proper repair if found defective. Plumbers and other workmen using gasoline torches and charcoal fires should be compelled to undergo a qualifying examination before being permitted to use apparatus which has so often been the cause of serious fires. Canada might even follow the example of Continental countries and penalize the owners of property upon which fires have originated from preventable causes, thereby endangering the property of their neighbors.

"If our Provincial Legislatures would only apply themselves seriously to this problem of fire prevention, all the troubles of which insured and insurers alike complain would quickly disappear. In some of the Provinces a beginning has been made by the appointment of a fire marshal, and where this has been done, good results have been obtained. But progress is not being made as fast as it should, partly due to the limited powers under which these marshals are working and partly to their unwillingness to exercise to the full the powers they have. The work calls for men who are more than mere investigators; they should be men of first-class organizing ability and possessed of the kind of courage that will compel obedience to common sense practices and regulations. Your committee earnestly hope that this meeting will see its way clear to bring the problem of fire prevention forcibly to the attention of all our Provincial Governments, for which purpose a resolution will be offered at the proper time."

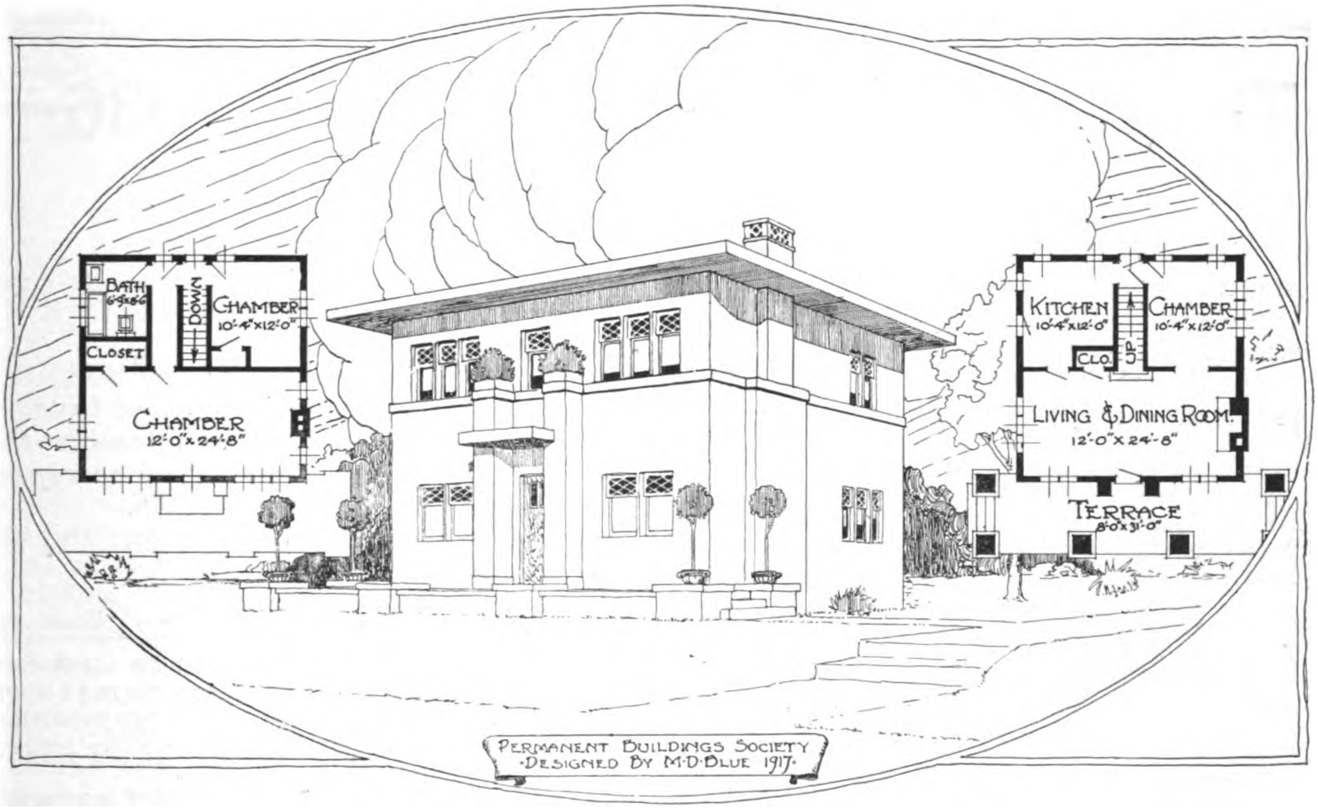
SAFE HOMES

Edited by **RALPH P. STODDARD, Secretary**
Society Advocating Fire Elimination

Firesafe Home—Low Priced and Artistic

THE growing demand for houses of safe construction has brought no fact more clearly to the fore than that there is a great scarcity of designs for homes of this type.

This applies more particularly to houses of moderate price—below the level of cost, where architects usually are employed to design them. Many of these are the product of contractors, built by themselves and kept in their own possession, so that the designs obtain very little circulation among prospective home-builders.



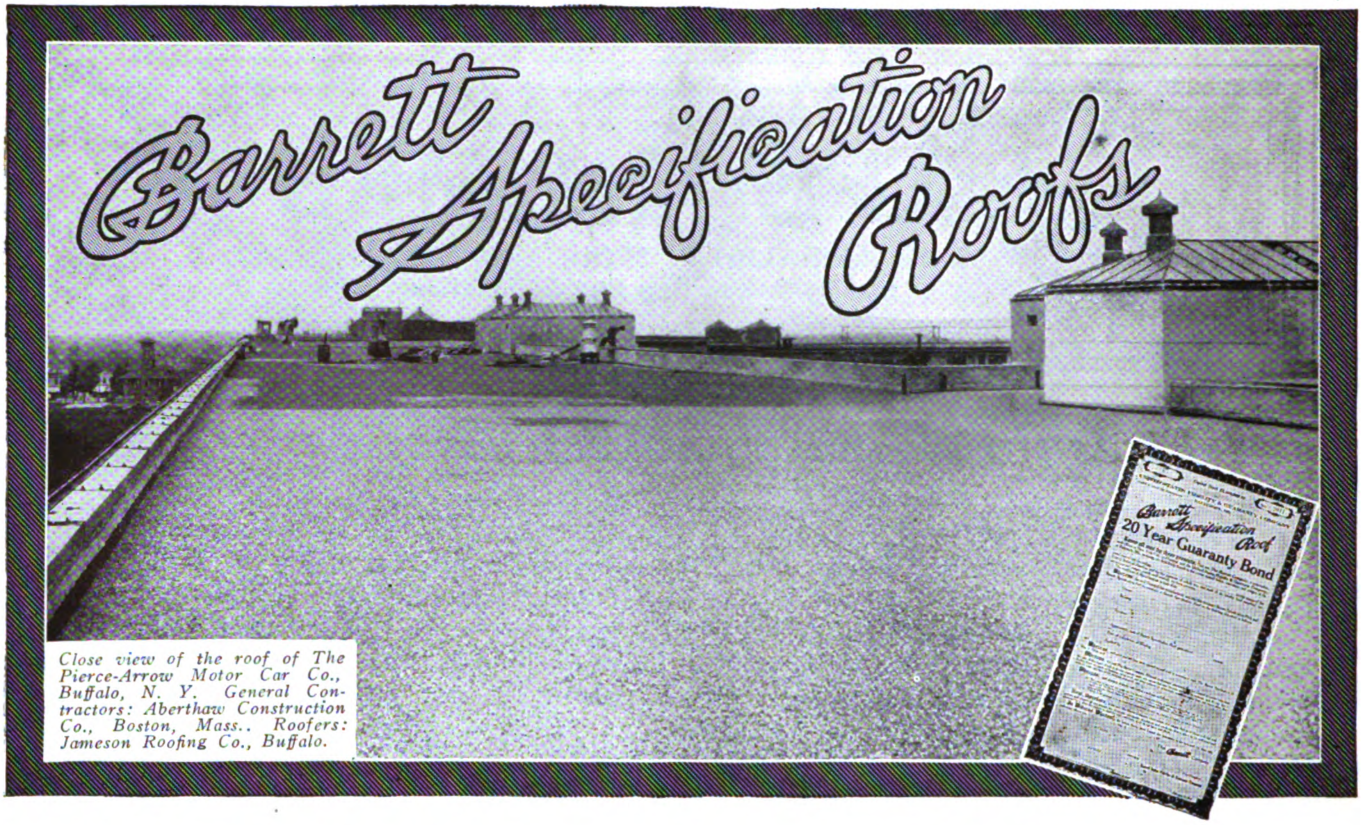
The supply of designs for frame houses is almost unlimited, even for those of moderate price. But most of these are not adaptable to safe materials, for the reason they abound in bays and other irregularities of the walls, which offer difficulties in the use of masonry products.

Great progress is being made, however, in supplying the demand for small safe homes. The Society Advocating Fire Elimination has been the distributing medium for thousands of practical plans, which are suited in design to the materials to be used and economical of construction. Houses from their designs have been built in all parts of the country and many more are under consideration for the near future.

Excellent work in this line is being done also by the Permanent Buildings Society, a group of Western manufacturers of safe materials, who have united to carry on promotion work in the interest of their products.

They have employed a group of architects to prepare plans for them of houses to cost from $3,000 to $10,000, so that the set will offer a selection to meet almost any demand.

The house shown in the accompanying cut is one of



Close view of the roof of The Pierce-Arrow Motor Car Co., Buffalo, N. Y. General Contractors: Aberthaw Construction Co., Boston, Mass.. Roofers: Jameson Roofing Co., Buffalo.

This Roof is Guaranteed until 1936—

THE following illustrates the working of our new plan to *guarantee Barrett Specification Roofs for twenty years.*

When the question of roofing was reached in the specifications covering the building illustrated, the Construction Department of The Pierce-Arrow Motor Car Company inserted approximately the following in the building plans:

"The roof shall be laid according to The Barrett Specification, dated May 1, 1916, and the roofing contractor shall upon completion of the job deliver to us the Barrett 20-Year Guaranty Bond, in accordance with Note 1 of such Specification."

Competitive bids were then asked for.

The concern to which the job was finally awarded promptly notified us regarding the job, asked for our Inspection Service, and the 20-Year Bond.

Our inspectors supervised the job, saw that the Specification was strictly followed both as to methods and materials, and on its completion certified that the roof was O. K. in every respect.

On this certification the United States Fidelity & Guaranty Company of Baltimore issued a 20-Year Surety Bond, which *exempts the owner from any maintenance or repair expense to the roof until 1936.*

The Guaranty Bond costs the owner and the roofing contractor nothing.

How to Get the 20-Year Guaranty Bond

This new Guaranty Bond is issued on all Barrett Specification Roofs of fifty squares or more in all towns in the United States and Canada of 25,000 population and over, *and in smaller centers where our Inspection Service is available.*

Our only requirements are that the roofing contractors shall be approved by us and that The Barrett Specification dated May 1, 1916, shall be strictly followed.

A copy of The Barrett 20-Year Specification, with roofing diagrams, sent free on request

The Barrett Company

Largest Manufacturers in the World of Roofing and Roofing Materials

New York Chicago Philadelphia Boston St. Louis Cleveland Cincinnati Pittsburgh
Detroit Birmingham Kansas City Minneapolis Nashville Salt Lake City Seattle Peoria
THE PATERSON MANUFACTURING COMPANY Limited: Montreal Toronto Winnipeg Vancouver
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TRADE B MARK

these of moderate price. It follows the so-called "Chicago school" of design, popularized by the designs of Frank Lloyd Wright. Much of its beauty lies in its extreme simplicity—its flat roof and plain walls, with an interesting grouping of windows; the substituting of a terrace to be shaded by awnings in Summer—for the orthodox roofed porch, which darkens the living-room for many months in the year when sun is at a premium, is an up-to-the-minute feature of house design.

A study of the plan shows an exceptionally good utilization of space. The rooms are large and square. The combined living-and-dining room is a strictly modern feature, which is coming more and more into general use. The third room on the first floor is available for use either as a bed-room or a dining-room as necessity demands. The family chamber is decidedly desirable. It will allow the placing of a large set of furniture, without crowding—something almost impossible in the average chamber.

Close estimates for different localities are impossible owing to the varying costs of labor and materials. An average for this little house, however, will be in the neighborhood of $4,250, constructed according to the architect's plans and without any expensive additions.

Building As Usual

That the country as a whole has taken to itself the slogan "Business as Usual," and is not being frightened into inactivity by the war, is shown nowhere more conclusively than in the increased volume of new building.

Reports from most parts of the country show substantial gains for the month of June over those of the corresponding month of last year. These give conclusive evidence that in spite of the panicky frame of mind displayed in some quarters, the building industry as a whole has kept heart and been undisturbed.

There was a pleasing gain of $393,580 for Greater Cleveland for June, 1917, over the corresponding month of last year.

Not one of the suburbs showed a loss, and as the greater bulk of building in such localities is residences and homes, this adds further proof that Cleveland is "The City of Homes."

As an evidence of the growth of manufacturing in Cleveland, there were 23 permits for a total of $372,600 as against 12 permits for a total of $353,500, a gain of 11 permits.

The gross gain of building for the year 1917 shows $1,574,290, a very creditable showing.

A study of these figures should convince anyone contemplating building that now is the time to do it, not only for the sake of having a home but also in an effort to keep business better than usual. Any loss in building activities is instantly reflected in the other lines of business.

Will Build Fire-Safe Homes

To erect, on a large scale, fire-safe homes exclusively, the Homesuite Home Company has been organized in Cleveland, Ohio.

The originator and guiding spirit in this new venture is Robert C. Mitchell, former general manager of the Barkwill-Farr Company. He has resigned from the brick-making company and is giving all his attention to the new project.

Present plans contemplate the erection of about one hundred to one hundred and fifty houses as an initial operation, in Cleveland's west side residential district.

The Homesuite Home Company realizes an ambition of years of Mr. Mitchell. While for years in the business of selling brick, he has seen the great majority of burned clay go into business buildings and practically none into homes, where it is equally practical and even more economical.

Mr. Mitchell, during his work in the supply business, has seen very clearly the lack of safe homes of moderate size and cost. He has seen the unfulfilled demand for homes of this sort grow, with no supply to meet even a part. He has seen persons having to content themselves with homes of frame, upon which upkeep begins immediately and depreciation eats up the increment on the land.

The financial backing of Mr. Mitchell and the large scale upon which he will operate insure purchases of materials in maximum quantities and an economical use of labor. This will result in the company's being able to sell their houses at the absolute minimum of cost to the home-buyer.

"Those we aim particularly to reach," says Mitchell, "is the great class of home-owners who normally purchase ready-built houses of the "speculative-builder" type. These are almost invariably of an inferior quality of frame construction and do not constitute, to my mind, good investments.

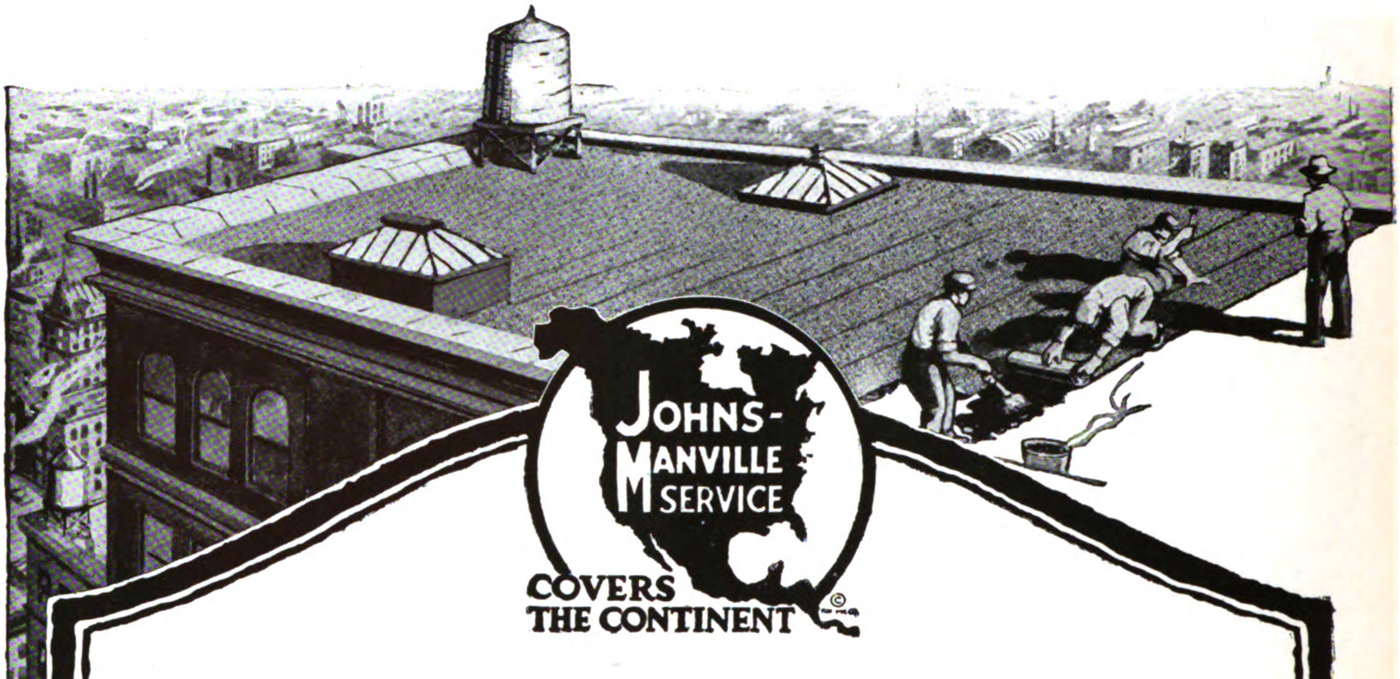
"The Homesuite Home Company, by reason of its quantity operations, will be able to sell at a cost to compete favorably with those of inferior frame construction. In addition, our plan of financing will enable the buyer to obtain one of our houses on terms more favorable than from the average speculative builder.

"While our immediate plans call for only from one hundred to one hundred and fifty houses, our facilities are such that we may, without difficulty, double this number."

Through the propaganda of the Society Advocating Fire Elimination a great impetus to the building of Safe Homes has been given, and many such houses are to be found in and about Cleveland.

And what has been done in the Cleveland territory might profitably be followed elsewhere throughout the country.

JOHNS-MANVILLE
ASBESTOS ROOFING



JOHNS-MANVILLE SERVICE
COVERS THE CONTINENT ©

Foster Building,
New York City
F. E. Townsend,
Architect

NO more convincing testimonial for the life of Johns-Manville Asbestos Roofing exists than mother earth's own history. For ages asbestos has repelled the fiercest heats, the shock of quick cooling, and earth's corrosive agents. Unscathed after all these tests, it comes to you felted into sheets, ready to apply to your buildings — a natural roofing material whose inherent properties answer every requirement that you would include in specifying an ideal roofing.

No other roofing material has such a past behind it—no other roofing has such a future before it on your building.

For flat roofs, Johns-Manville Asbestos Built-Up Roofing. For sloping roofs, Johns-Manville Flextone Asbestos Roofing. For skeleton framing, Johns-Manville Corrugated Asbestos Roofing. For homes, Johns-Manville Transite Asbestos Shingles. All these roofings are backed by

Johns-Manville Roofing Responsibility

—a principle that certifies the service of every Johns-Manville Asbestos Roofing. You can register your roofing with us, and thus be assured of complete satisfaction in the service it gives.

H. W. JOHNS-MANVILLE CO.
NEW YORK CITY
10 Factories—Branches in 55 Large Cities

WEATHER:
Always warm in winter and cool in summer if you are in a firesafe home, office or factory building.

The Fireproofing News

CONTAINING DETAILED DESCRIPTIONS OF NEW DEVICES AND APPLICATIONS OF MATERIALS WHICH ARE OF REAL VALUE IN FIRESAFE BUILDING: ALSO NOTES ON THE LATEST BOOKLETS, CATALOGS AND OTHER FIRESAFE LITERATURE, WITH OTHER ITEMS OF INTEREST TO THE FIREPROOFING FRATERNITY

LATEST EDITION

Copyright by Constrvction Publishing Co., of New York, N. Y., 1916

New York City, N. Y., July, 1917

Priceless

NOTABLE EXAMPLE OF PUBLIC BUILDING CONSTRUCTION

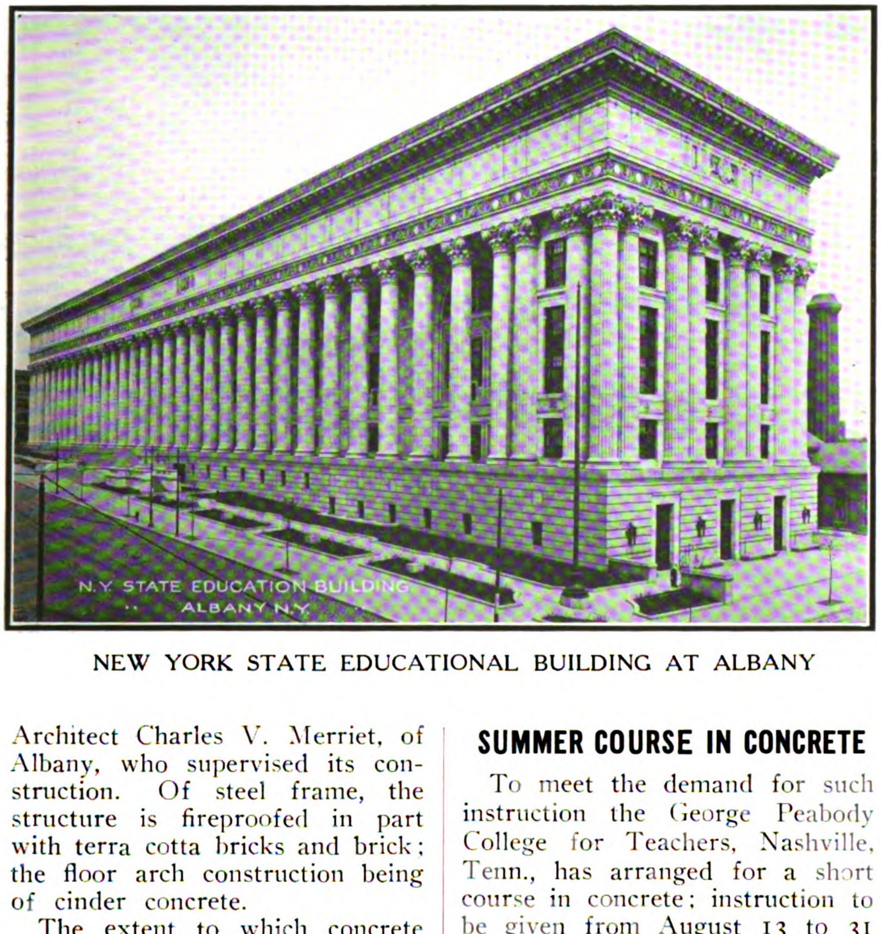
Classic in design and admirable in construction the New York State Education Building at Albany is a notable structure and excites warm commendation from all competent to pass judgment upon its merits, as well as from laymen who view it merely from an æsthetic standpoint.

The building was designed by Architect Charles V. Merriet, of Albany, who supervised its construction. Of steel frame, the structure is fireproofed in part with terra cotta bricks and brick; the floor arch construction being of cinder concrete.

The extent to which concrete was used may be inferred from the fact that 50,000 barrels of Hilderberg cement was used in its completion.

Admirably proportioned and conveniently arranged in both its interior and exterior, it is gratifying to note that the firesafety of the building occupied a large share of the architect's attention in its planning.

Would that we had more public structures of the same general type!



NEW YORK STATE EDUCATIONAL BUILDING AT ALBANY

SUMMER COURSE IN CONCRETE

To meet the demand for such instruction the George Peabody College for Teachers, Nashville, Tenn., has arranged for a short course in concrete; instruction to be given from August 13 to 31 inclusive. The work will be undertaken in co-operation with the Extension Division of the Portland Cement Association.

"KNO-BURN" STANDS SEVERE TEST

So pleased was Architect Arthur H. Ebeling with the wearing qualities of "Kno-Burn," expanded metal lath, a section of which was removed from a residence to which additions were being made, that he wrote its manufacturers, the Northwestern Expanded Metal Lath Company of Chicago in part as follows: "In removing the exterior stucco and lath I observed the excellent condition of the metal lath which was applied nine years ago and is in exactly the same condition that it was the day it was put on, having taken on no rust whatever. The stucco applied was cement mortar as a scratch coat—enough to thoroughly imbed the metal lath. The second and third coats were of cement mortar with a small proportion of lime added to act as a retarder. No waterproofing of any description was used on this work."

◆

SECOND VICE-PRESIDENT OF NATIONAL FIREPROOFING COMPANY

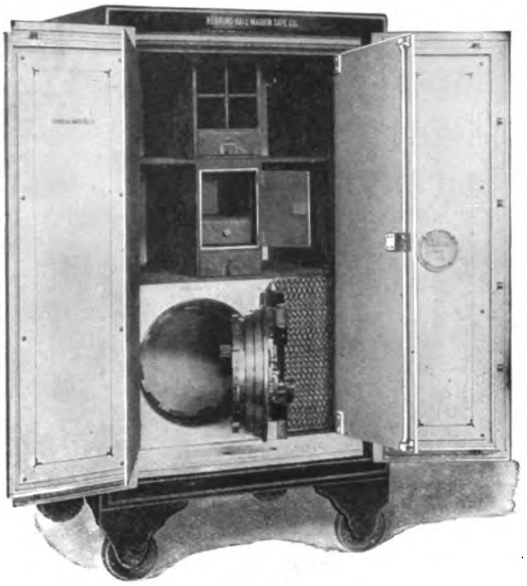
V. L. Yepson has recently been selected second vice-president and general manager of sales of the National Fireproofing Company of Pittsburgh. Mr. Yepson has been connected with the corporation for a number of years, and has shown signal ability in studying the needs of the building fraternity and the best means of supplying them. His advancement has been fully earned and will result in broadening the activities of the National Fireproofing Company.

◆

The business and property of the Thomas Miller Company of Jamesville, N. Y., has been taken over by the Alpha Portland Cement Company.

HERRING-HALL-MARVIN SAFE COMPANY

Designers and Manufacturers of



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This cannot happen with Metal lath

Blackboard talks by the professor

No. 2--"The Plaster Can't Crack or Fall"

"A BIG disadvantage in using old-fashioned wood lath is the cracking of the plaster. This is due to the fact that with atmospheric changes, wood lath will swell and shrink to a greater degree than the plaster; therefore, the two will separate, unsightly cracks will occur and sometimes large areas of plaster will break and fall without warning.

Berger's Metal Lath

entirely overcomes this. It expands and contracts in the same ratio as the plaster, thus preventing cracks.

"Plaster on wood lath is not safe, as it is only latched to the lath. On the other hand, Berger's Metal Lath is clinched by the mortar, the entire surface being reinforced. This makes a rigid construction, which adds to the structural strength of a building."

Send for Technical Booklet F C

The Berger Mfg. Company, Canton, O.

BRANCHES:—Boston, New York, Philadelphia, Chicago, St. Louis, Minneapolis, San Francisco, Los Angeles.

EXPORT DEPARTMENT—Berger Building, New York City, U. S. A.

POINTS REGARDING ROOF COVERINGS

Architects, engineers and others concerned in the construction or ownership of buildings should secure and carefully read the folder entitled, "When Your Roof Wears Out, What Then?" issued by the Keasbey & Mattison Company, Ambler, Pa. The composition of the asbestos shingle worked by the company, the process of its manufacture and the results secured from its use, are interestingly set forth, and the proof of each statement made may easily be ascertained. The products of the Keasbey & Mattison Company rightly enjoy an enviable reputation.

◆

BUILDING MATERIAL SHOW AT CHICAGO

To replace the cement shows that have been held each year in Chicago since 1906 a cement machinery and building material exhibit will be given in the Coliseum of the Garden City from February 6 to 13, 1918. It is figured that the new show will have all and more attractive exhibits than former displays, and that the attendance will exceed that of former years.

◆

Several hundred brick houses of the Colonial type will be erected at Lordship Park, Bridgeport, Conn., for the Bridgeport Housing Company.

◆

It is said that in France they are building houses from concrete made of ground slag mixed with hydraulic lime in the proportion of three sacks of lime to one cubic yard of slag. The mixture is known as *"pise de machefer."* It is rammed between wooden frames to form walls about 18 in. thick. It is used for every kind of building, including cottages, country houses, warehouses, factories, etc.—*Building Age.*

DECISION IN CONCRETE-MIXER SUITS

Decision in the action of the Koehnig Machine Company against the Oshkosh Manufacturing Company for alleged infringement of patent was recently secured by the plaintiff corporation. An accounting of damages and profits was ordered.

◆

AMERICAN CERAMIC SOCIETY MEETS

In point of valuable information gleaned the gathering of the American Ceramic Society at Hornell, N. Y., on July 17-20, was easily the best in the history of the organization.

The intsructive and diversified program was carried out to the letter, the presentation of papers and discussion thereon being interspersed with visits to educational and manufacturing properties at Hornell, Alfred, Corning, Canandaigua and Rochester.

for

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VALUE OF USING FIRE-RESISTING BUILDING MATERIALS

A most striking example of the value of using fire-resisting materials in connection with building construction is found in the case of a motion picture theater and apartment building at Uhrichsville, Ohio, which was partially destroyed by fire. The first floor of this building was constructed of wood and the second floor with Berger's metal lumber. As might naturally be supposed the wooden floor burned freely and was practically destroyed, while, on the other hand, the metal lumber on the floor above tended to prevent the fire from getting beyond the first floor. The point is made by the Berger Mfg. Company, Canton, Ohio, makers of the metal lumber in question, that fires of this character prove the importance of using fire-resisting building materials throughout. The claim is made that metal lumber can be worked almost as readily as wood and at the same time gives an economical fireproof construction, being adapted to any size or type of building.—"Building Age."

◆

EXPLAINS "COR-MESH" AND ITS USE

From the latest catalogue of the Corrugated Bar Company of Buffalo, a great deal of interesting and useful data may be had concerning "Cor-Mesh," and its advantages in building construction. The booklet cortains a series of engineering tables and is replete with illustrations showing the material in use and the method of applying it.

◆

Contracting builders in Augusta, Ga., have formed the Builders' Exchange of that city, with an initial membership of 470. J. T. Lawrence is president and C. H. Van Ormer secretary.

BUILDING OPERATIONS IN NEW YORK STATE

Building operations were better in June, 1917, than in the previous month, according to returns received from the building departments of the ten first and second class cities of the state. The estimated cost of work (four-fifths of which was new construction) for which permits were issued was 38 per cent greater than in May. Four cities only—Buffalo, New York, Schenectady and Yonkers—reported an increase, the other six reporting decreases. The borough of Brooklyn, in which was more than one-half of the total value of all permits in the entire state, was responsible for the increase. As compared with June, 1916, there was a decrease of 50 per cent, three cities only—Schenectady, Utica and Yonkers—reporting an increase.

◆

A new incorporation is the Dolan Brick Company of Richmond, N. Y.

WHY BUILD WITH BRICK?

From a prize essay contributed in response to the query given in the caption, "The Clay Worker," prints the following:

"Why should we build with brick? Because brick is the one material which satisfies all the demands of the modern builder—endurance, safety, comfort, health, beauty and economy.

"Of the materials offered for building, which is the most permanent? Wood decays in the course of ten or fifteen years. The stone generally used for building purposes will last longer than wood, be prettier and look more imposing. But stone will gradually decay and crumble away. Brick will not decay, because it is now so made that it resists the action of water, heat and cold. By the 'ultimate test' of everything, time, the durability of brick has been proved.

"After being baked for days at a white heat, the modern vitrified brick is wholly unaffected by the heat of fire. Thus we see by using brick we can help lessen the disgracefully large per cent of loss by fire in America; for, according to government reports, the larger per cent of the losses is due to wood structures.

"The walls of the brick buildings are thicker and less penetrable than those of a wood structure, thereby being cooler in summer, warmer in winter, and deadening to sound. Because of the composition of brick, no decay, which is injurious to health, takes place.

"The beauty of brick buildings is almost unsurpassed in modern architecture, for the possibilities which the many shades of brick now obtainable afford in pattern work and artistic touches are almost unlimited.

"Many of the best examples of brick architecture in England, Holland and Belgium are noted for their pattern work.

"Though a building is durable, safe, comfortable and beautiful, we can possess it only on condition that we are rich, if it is not an economic proposition. The first cost of building with brick is about 10 per cent more than the first cost of building with wood, but it is much less than that of a stone one. When the first cost is paid the cost of a brick building is complete, whereas the wood building must be repainted and repaired frequently. In about ten years the continual cost of painting and repairing would pay the 10 per cent difference. Why not pay more once than to be continually dropping a nickel in the painter's hat and have a building that is always in repair and just as valuable, if not more so, twenty-five years hence as it is now? The brick structure will command a higher price any time than the wood building, and will not so deteriorate in value as it grows old. The insurance on brick buildings is another economic advantage of brick, for the insurance rates on structures of brick are always lower than the rates on buildings of wood.

"Wood has just one weak argument in its favor, stone has about two stronger ones, but brick outshines them both when they are at their best, and fills all six requirements; everlasting endurance, safety, comfort, health, beauty of design and decoration and comparative economic value."

◆

SETS FORTH MERITS OF SLATE ROOFING

The numerous merits of Bangor vein slate as a roof covering are attractively and convincingly set forth in a booklet issued by the Bangor Slate Association, Inc., of Bangor, Penna.

◆

MERGER OF STEEL COMPANIES

Under the name of the Blaw-Knox Company, the Blaw Steel Construction Company and the Knox Pressed and Welded Steel Company have amalgamated. General offices will continue to be located at Pittsburgh.

◆

NOW LOCATED AT NILES, OHIO

The extension plant and offices of the Sykes Metal Lath and Roofing Company have been transferred from Warren to Niles, Ohio, where increased facilities have been secured for turning out the product of the corporation, the demand for which is growing rapidly.

TRADE CO-OPERATION NEEDED

H. P. Sandles, secretary of the Ohio Macadam Association, is a vigorous character with a record for "doing things." Effective work among business men can only be accomplished, he asserts, through cordial and constant co-operation. Addressing members of the Ohio Builders' Supply Association at their recent annual convention at Cedar Point, Mr. Sandles said in part:

"When the war was first declared the country gave way to panic and hysteria. The sentiment spread that business must slow down, but when we caught our breath we discovered that instead of putting on the brakes we must open up the throttle and hustle even faster than before. There is no sensible reason for doing anything else. Money is plenty, everybody that wants it has a job and some who don't, crops are fine and the next two years will be one of the greatest eras of prosperity this country has ever seen. Optimism and energy will help win the war. It will cost less to win across the water than to lose, and we have got to win. If we don't win across the water we must win here. There are no half way stations in patriotism. We're all going to take hold and win the war.

"To that end we must see to it that we do not palsy business. The most important factor today in the business world is organization and co-operation. The government at Washington wants to do business with representative organizations, not individuals. When your secretary goes to Washington he represents an association of business men who have found out it doesn't pay to fight alone or among themselves. Through their organization they have gained confidence in each other. Cutthroat competition has been eliminated. Don't get the idea that I consider associations are for the purpose of fixing prices. They are not. The business of a well-managed association is to cut costs, save waste and find new markets. If this is effectively done prices will take care of themselves and there will be no need of "agreements."

She: "If we must cut down expenses, why not drop your life insurance?"
He: "Not much. That's *your* insurance, not mine. I figure we can trim about all the other items so as to save at least $400 a year, and I'm going to take a hundred of that and buy another Postal policy while I can get it. You and the kiddies may be glad some day."
She: (thoughtfully) "I guess you're right at that, Jim."

Put Life Insurance in Your Family Budget —and Keep It There

THE *real* husband always makes a liberal allowance for life-insurance whether his wife wants him to or not, but the sensible woman *does* want him to when she considers it seriously.

And whether times are hard or easy they both want the most protection possible for their money, and hundreds of them during the last decade have therefore been turning to the

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Occupation ....

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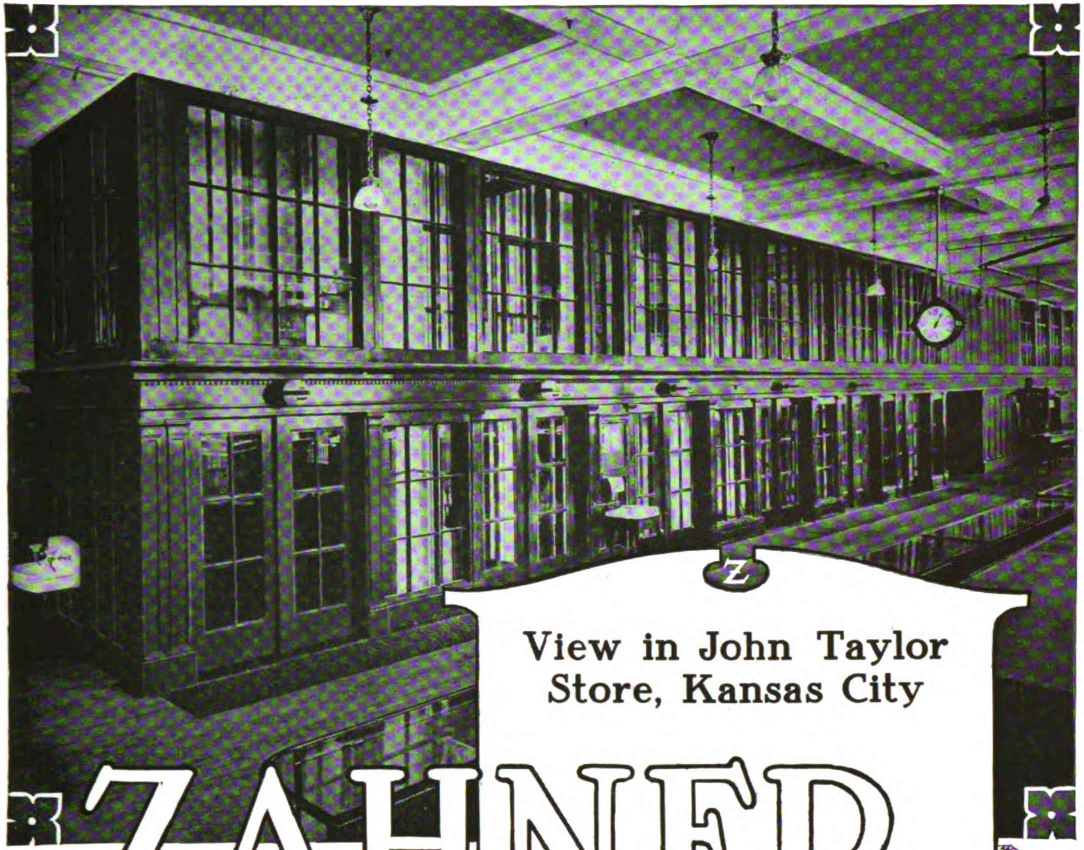
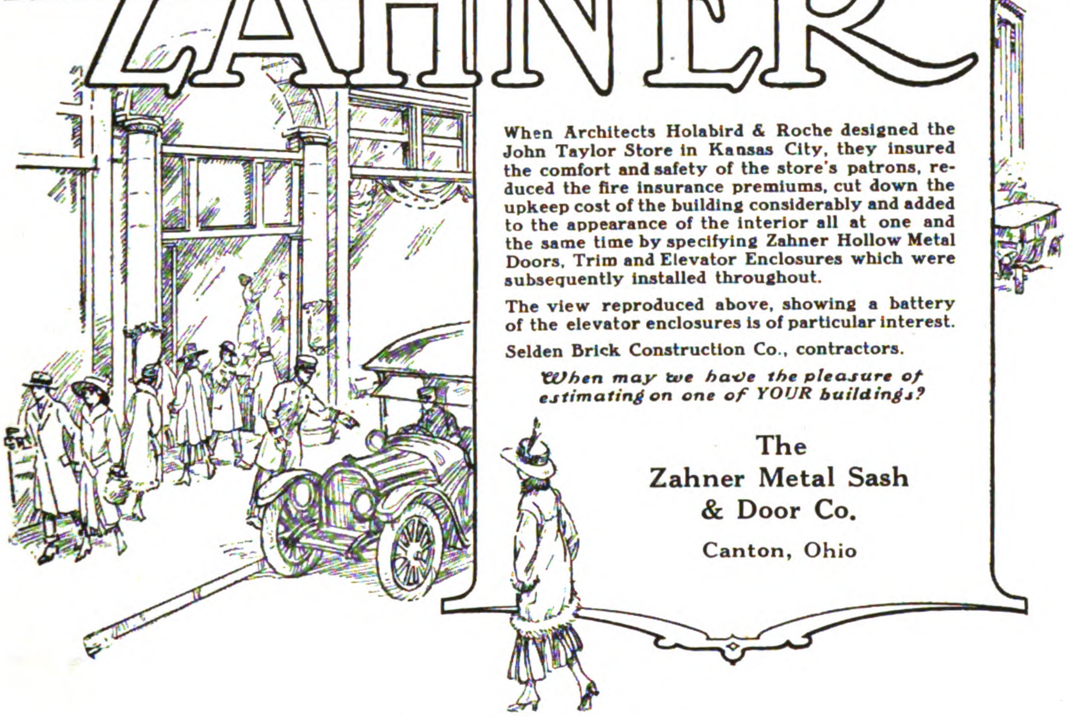


View in John Taylor Store, Kansas City

ZAHNER



When Architects Holabird & Roche designed the John Taylor Store in Kansas City, they insured the comfort and safety of the store's patrons, reduced the fire insurance premiums, cut down the upkeep cost of the building considerably and added to the appearance of the interior all at one and the same time by specifying Zahner Hollow Metal Doors, Trim and Elevator Enclosures which were subsequently installed throughout.

The view reproduced above, showing a battery of the elevator enclosures is of particular interest.

Selden Brick Construction Co., contractors.

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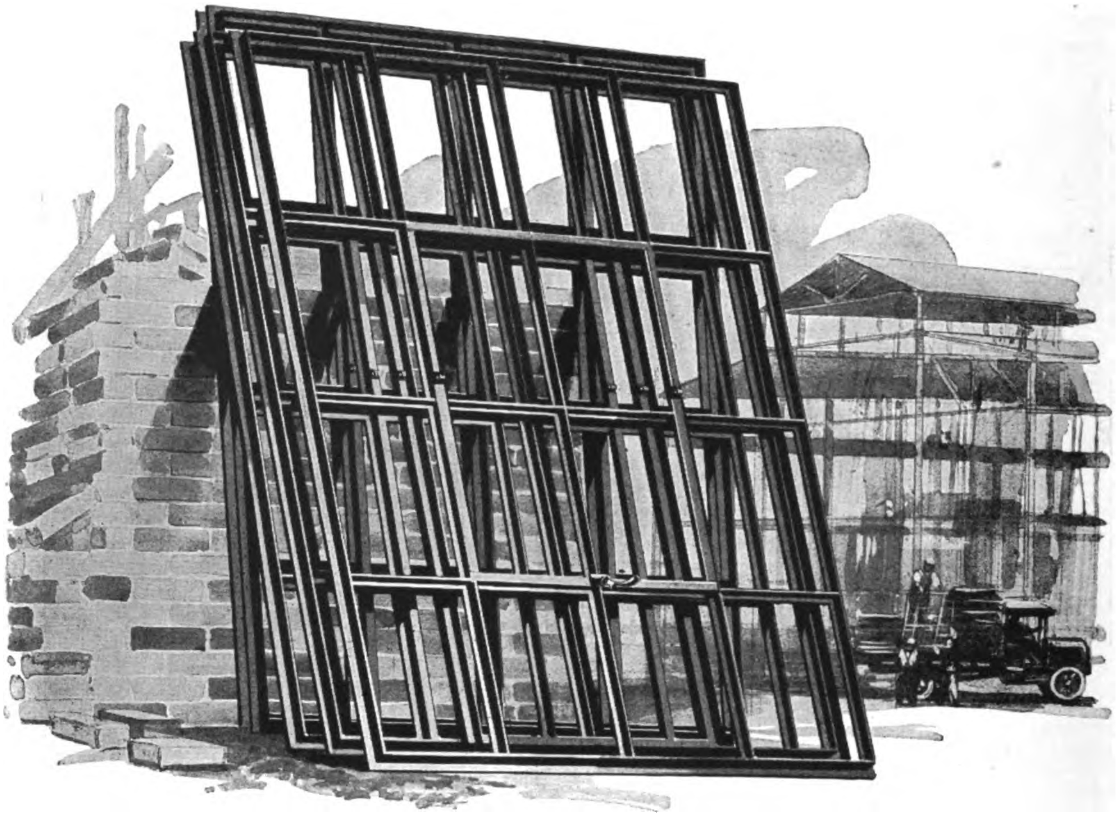

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4′ 8″	5′ 2″
6′ 2⅜″	6′ 10⅜″
7′ 8¾″	8′ 6¾″
9′ 3⅛″	10′ 3⅛″
Widths	Widths
3′ 2″	3′ 8″
4′ 2⅜″	4′ 10⅜″
5′ 2¾″	6′ 0¾″

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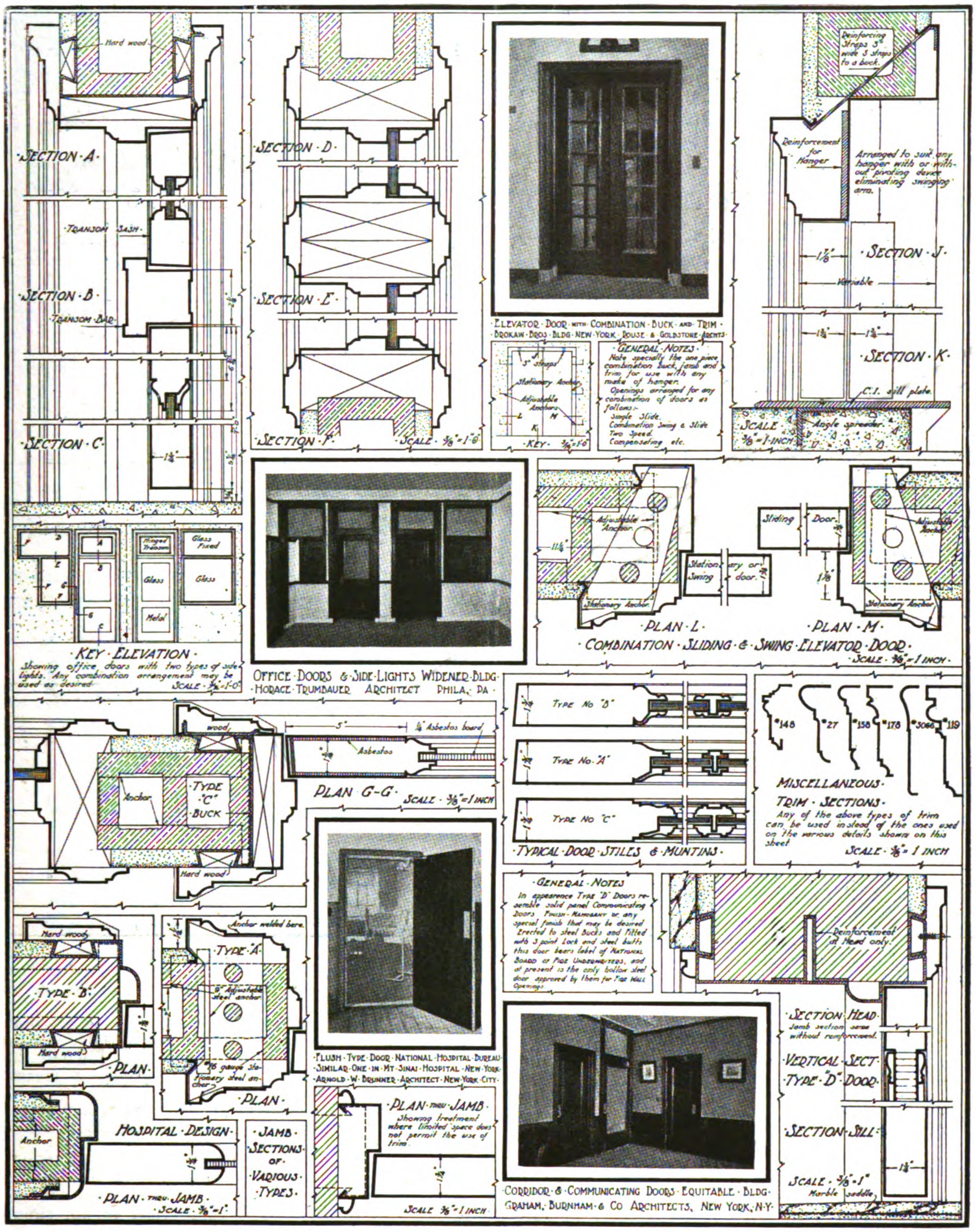

·Elevator·Door·with·Combination·Buck·and·Trim·
·Brokaw·Bros·Bldg·New·York·Rouse·&·Goldstone·Archts·

·General·Notes·
Note specially the one piece combination buck, jamb and trim for use with any make of hanger.
Openings arranged for any combination of doors as follows:-
Single Slide.
Combination Swing & Slide
Two Speed.
Compensating etc.

·Key Elevation·
Showing office doors with two types of side lights. Any combination arrangement may be used as desired.
Scale ⅜"=1'-0"

Office·Doors·&·Side·Lights·Widener·Bldg·
·Horace·Trumbauer Architect Phila. Pa·

·Miscellaneous·
Trim·Sections·
Any of the above types of trim can be used instead of the ones used on the various details shown on this sheet.
Scale·⅜"=1 inch

·General·Notes
In appearance Type "D" Doors resemble solid panel Communicating Doors. Finish—Mahogany or any special finish that may be desired. Erected to steel bucks and fitted with 3 point lock and steel butts this door bears label of National Board of Fire Underwriters, and at present is the only hollow steel door approved by them for Fire Wall Openings.

·Flush·Type·Door·National·Hospital·Bureau·
·Similar·One·in·Mt·Sinai·Hospital·New·York·
·Arnold·W·Brunner·Architect·New·York·City·

·Plan·thru·Jamb·
Showing treatment where limited space does not permit the use of trim.
Scale ⅜"=1 inch

Corridor·&·Communicating Doors·Equitable·Bldg·
Graham, Burnham·& Co Architects, New York, N.Y.

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We call them "Safety First" because they protect from rain or storms, from heat or cold and from the common agencies which spread fire.

Reynolds Shingles are the standard asphalt Shingles and you will make no mistake in insisting on Reynolds Shingles.

If your dealer cannot supply you write the factory.

UNDERWRITERS' LABORATORIES INC
INSPECTED
ROOFING MATERIAL
CLASS C
ISSUE No. 118

H. M. Reynolds Asphalt Shingle Co.

"Originators of the Asphalt Shingle"

Grand Rapids MICHIGAN

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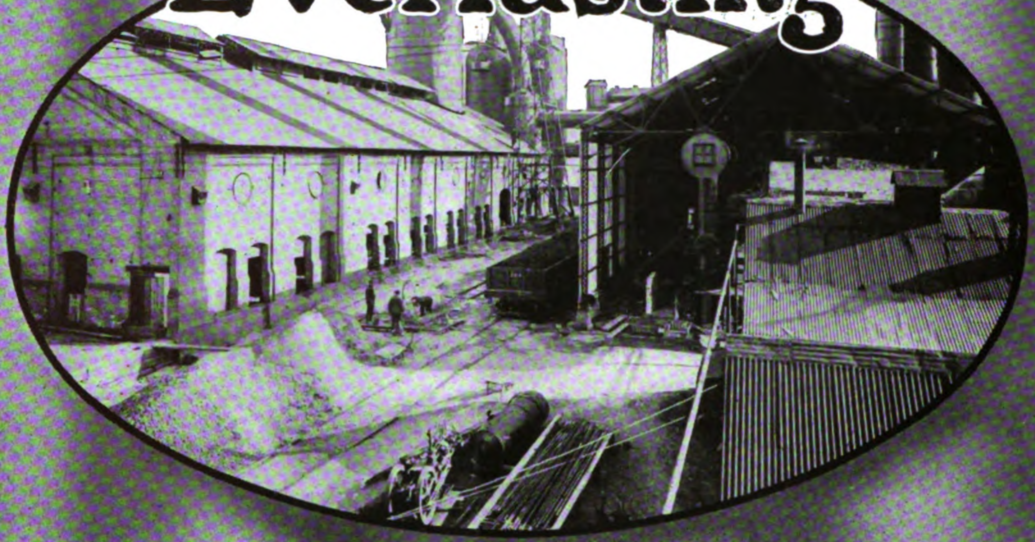

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While weighing about the same as corrugated iron roofing, the sheets of

Ambler Asbestos Corrugated Roofing and Siding

can be applied to the same type of structure by the same class of labor.

And fire cannot harm it, mine gases do not affect it and it will practically last forever—no interruption of output due to the necessity of repairing.

Ambler Asbestos corrugated roofing and siding is built up of cement on a mesh of asbestos fibre—and like all concrete becomes ever more weather persistent, as the years roll by.

Write for the facts which prove all the above claims.

KEASBEY & MATTISON COMPANY
DEPT. B-3 Ambler, Pa., U. S. A.

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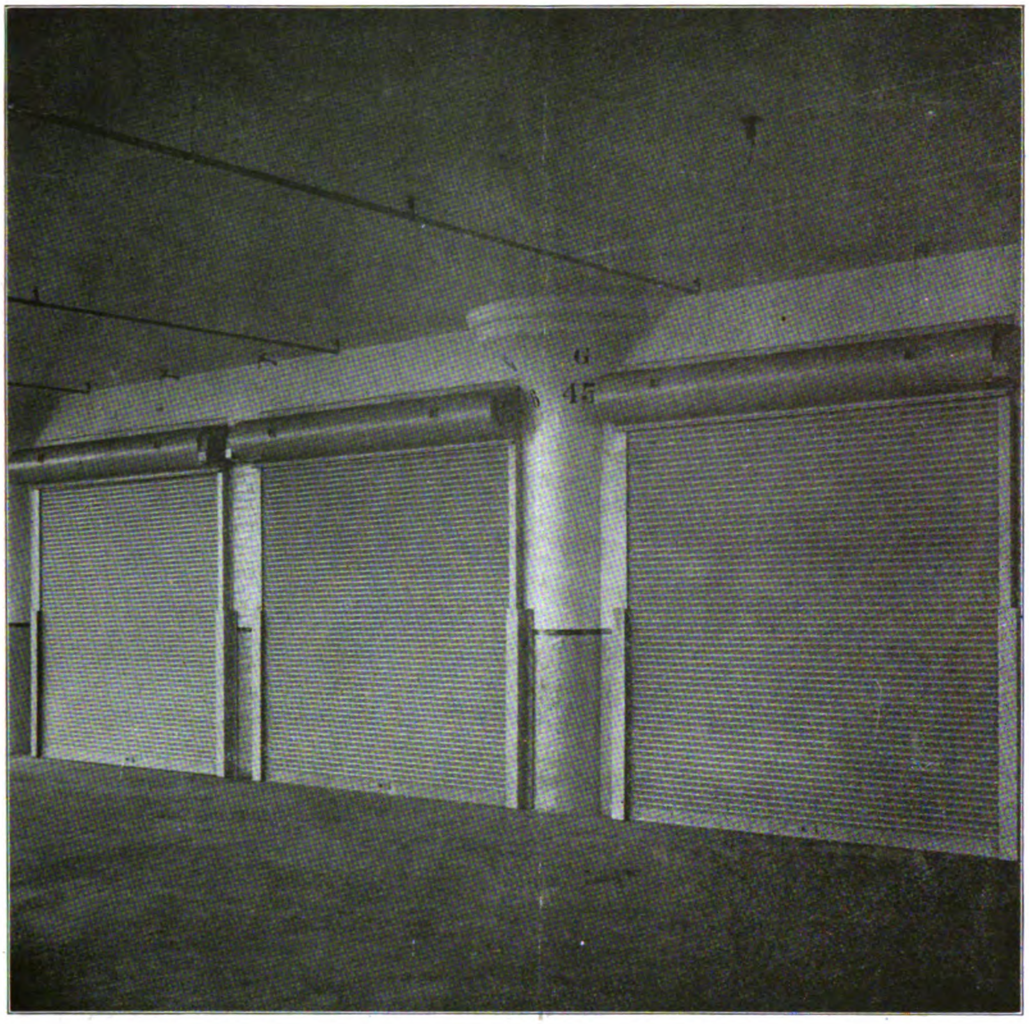

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have been refined to meet the most exacting architectural requirements and are available for any type of construction or for practically any kind of opening.

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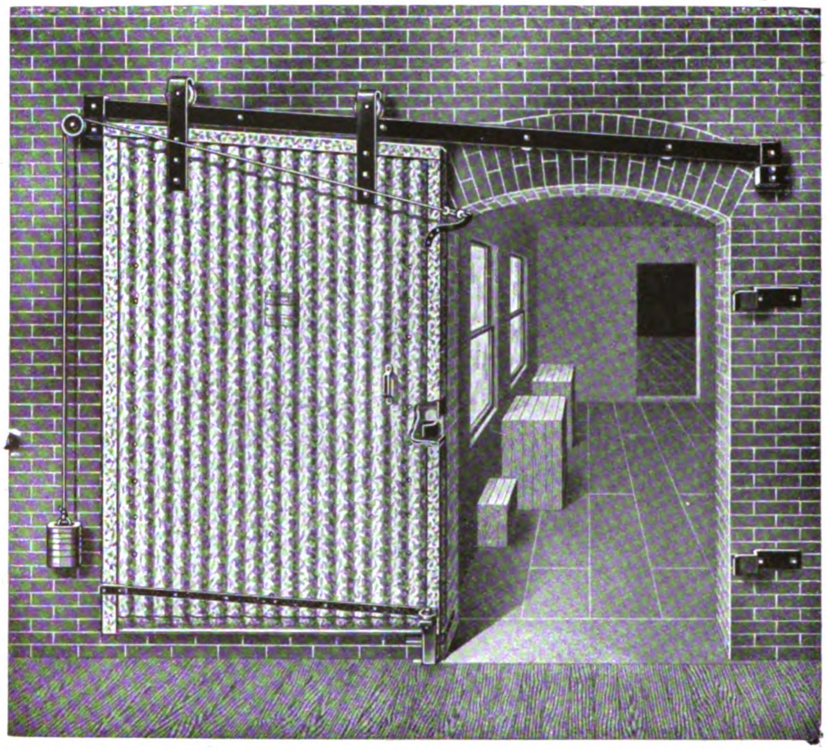

U. S. GOVERNMENT

has purchased for the Ordnance Depot of the U. S. Army at Corozal, Panama Canal Zone, **TEN**—

"ALMETL" FIRE DOORS
(Patent Pending)

As the needs of this building require a door that cannot fail as a fire retardant, the selection of "Almetl" Doors is proof of their ability to prevent the spread of flames.

Approved by Underwriters Laboratories, Chicago, Factory Mutual Laboratories, Boston and National, State and Municipal Authorities.

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CHICAGO
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KANSAS CITY

NOWADAYS IT'S GLOBE AUTOMATIC SPRINKLERS

If There Is a "Doubting Thomas"

When the necessity for

Globe Automatic Sprinklers

in the Building Projects now contemplated is under consideration,

Let Him "Read, Reflect and Inwardly Digest" the following:

In this day and age, discussion of the efficiency and paramount value of the automatic sprinkler to business interests has only a **positive** side—there are no negative views on the subject.

AN INSTALLATION OF GLOBE SPRINKLERS IS

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Puts Out Little Fires

Prevents Big Ones

If you do not wish to take the necessary funds from your business, or incur loans from your bankers, the Globe Deferred Payment Plan will enable you to pay the cost of a Globe Sprinkler Equipment from your insurance savings and without additional expense.

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"YOU CAN AVOID THIS"

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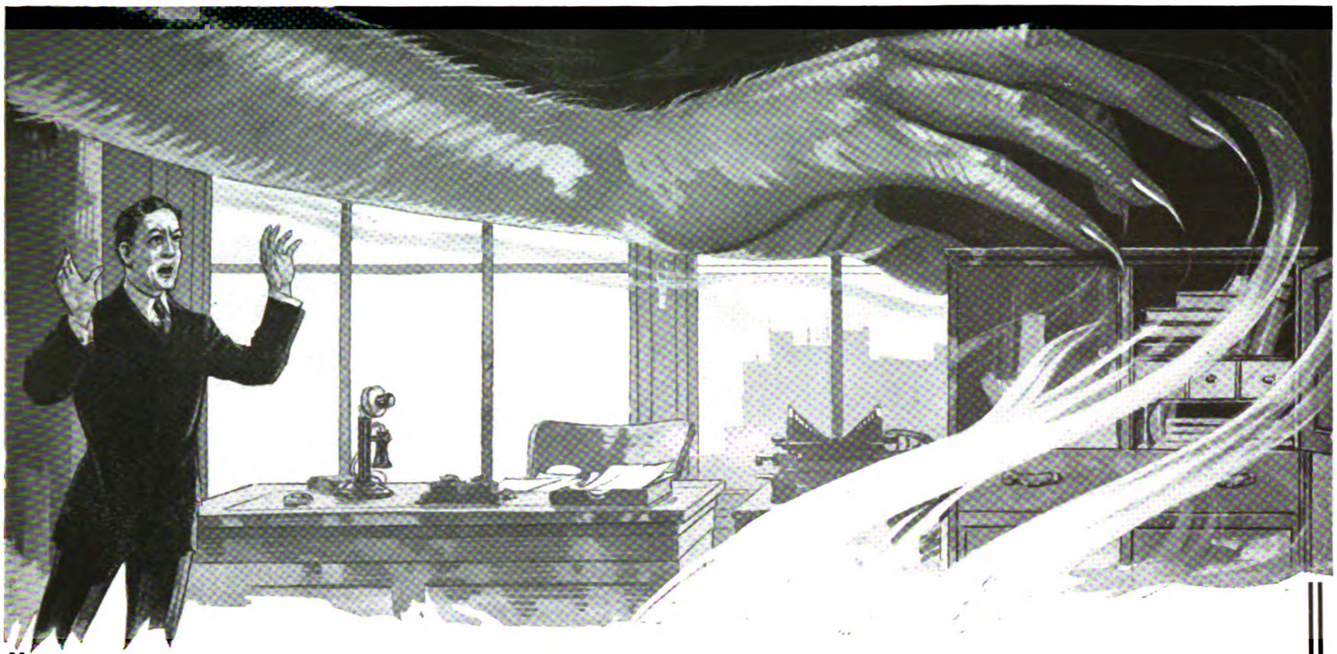

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CONSTRVCTION

ADVOCATING THE CONSISTENT VSE OF
FIREPROOFING MATERIALS & PROTECTIVE DEVICES

VOL. V AUGUST, 1917 No. 2

Building Is Cheap To-Day

A CLOSE and intelligent analysis of the building situation refutes the popular belief that new construction should not be undertaken at this time, and instead proves the contrary to be the case.

In support of the latter assertion, *Modern Building* offers that:

Prices are only comparative. When we say that a certain product is dear or cheap we cannot consider that article by itself alone, but must compare it with other products in other lines of industry. It is not the number of dollars which a certain thing costs that determines its worth, but rather the amount that the dollar will buy if otherwise invested.

In the light of this basic truth, let us investigate the cost of building to-day. It is generally believed that one of the most economical times for building in recent years was back in 1914, so we will use that year in comparison with 1917 as the basis for determining the relative economy of building.

Prices of raw products—particularly food—are generally considered as showing the purchasing power of the dollar. Look over the prices of such products in 1914 and compare them with the prices to-day. Wheat in those days was worth $1; to-day it is $2.80. Corn was less than 70 cents; to-day it is nearly $2. Oats was under 40 cents; to-day they are practically 80 cents. Hogs were about $7; to-day they are $17. Cotton was 10 cents, and is to-day 24 cents. Go all through the list—copper, steel, coal, all basic materials—and you will find an increase of 100 per cent and upwards.

Now let us look at the cost of building materials in the same periods of 1914 and 1917. In those days Portland cement was selling at $1.75 a barrel; to-day it is $2.45. Common brick sold for $7 per thousand, and now cost $12. Plaster was $7.50 per ton; to-day it is $10.50. Lumber shows about the same relative increase, which, in the main, averages about 30 per cent.

Similarly, the cost of labor employed in building, such as bricklayers, carpenters, plasterers, masons, etc., has increased, but this increase, including all classes, averages only 18 per cent. Add to these comparisons the slackening of building since the war and the corresponding tendency of contractors to figure closely, and it is readily seen that the cost of building has not kept pace with the increase of prices in other industries.

These basic facts and comparisons should show conclusively to far-sighted investors that now is a favorable time to build. There is no prospect for the falling of prices in building materials even if peace were to come at once. In fact, the reverse may be true, owing to the great demand for materials which will be required to rebuild destroyed districts and to take care of activities stopped by the war.

Our countrymen should realize that building costs are low and that building in general affords one of the safest investments in precarious times. Certain it is that a bushel of wheat or a bale of cotton will buy more square feet of building now than it would have at almost any other time. A dollar invested in building will buy relatively more than of any other commodity. *Now* is as good a time as ever to build!

Fire Danger Zone in New Jersey Communities

A SERVICE of pronounced value recently undertaken by the New Jersey Schedule Rating Office, and which it plans to systematically carry on, is the issuance of maps clearly defining the protected and unprotected fire zones in the smaller cities and towns of its home State.

Upon the reverse side of each map sheet the population, water supply, fire-fighting equipment, safety building ordinances, if any, are given, together with other data bearing upon the community fire hazard. Thus far fifteen such maps have been filed with the New Jersey Commissioner of Banking and Insurance, where they may be studied either by the interested municipal officials or by concerned property-owners.

The purpose of the survey is to clearly point out the aggregate fire hazard of a city, as well as to record the sectional danger spots, thereby permitting of the intelligent adoption of safety measures, both for individual risks and for the protection of the community as a whole.

The idea is a decidedly valuable one and should have the cordial support, not alone of the insurance men, but of municipal authorities and private property-owners as well, for it is upon the last named, in the final analysis, that the burden of the nation's fire loss falls.

Once this fact is borne in upon the minds of business men—and the issuance of the zoning maps by the New Jersey Schedule Rating Office will go a long way toward driving home the truth to the citizens of New Jersey—the sooner will we have better building laws and practices, more stringent "clean-up" regulations; and the logical result will be a decrease in the aggregate fire loss and a vast saving of property values.

Desirable at all times, the protection of buildings and their contents from fire becomes a paramount duty in these trying war days.

Clearing House for National Building Legislation

"SOME day," says the house organ of the Knickerbocker Portland Cement Company, "there will be State clearing houses, or—is it hoping too much?—a National clearing house for municipal and State legislation.

"This will avoid much needless duplication of effort and expense in making laws.

"For example, why should the minimum strength of a concrete floor, under the same structural conditions, be different in New York than in Chicago?"

No sensible reason exists for variation in building requirements, under like conditions, anywhere in the country, and it is with a view to removing the conflicting regulations now obtaining that CONSTRVCTION has been urging the adoption of a National Building Policy, the operation of which would greatly facilitate construction methods everywhere; helping substantially the architect, engineer, contractor, material manufacturer and property-owner.

The wisdom of adopting a National Building Policy seems so obvious that the wonder is such a course was not decided upon long ago.

A systematic inspection of the public schools of New York city, with a view to reducing the fire hazard of the properties, will be undertaken in accord with a plan formulated by Superintendent of Buildings Snyder.

"Fire prevention is easier, safer and more profitable than fire fighting."

Calls for Metal Furniture

FOR three successive years the Register of New York County has asked for a special appropriation from the Board of Estimate, wherewith to equip his offices with metal furniture for the safe preservation of the valuable public records entrusted to his keeping.

While the Registry Building is of recent and semi-fireproof construction, and the danger of its destruction by fire is considered remote, the Register yet appreciates that the contents of the property are highly inflammable and that a great forward step in their preservation would be taken if the various offices were supplied throughout with metal furniture.

The entire reasonableness of the Register's request is recognized, and despite the exceptional call upon the country's exchequer this year, it is felt the money asked for by Mr. Hopper will be granted.

Municipal officials as well as private business men throughout the country are more and more appreciating the advantages of well-built metal furniture and are adopting its use in their respective offices. Papers of the greatest value are frequently left upon open wooden desks and cabinets, where their complete loss by fire would be but the work of a few moments. The likelihood of such happening is greatly reduced where metal furniture is used; and to such an extent is this the case that the use of such furniture, where public records are involved, should be made compulsory.

Dwelling House Losses in Mississippi

TOWN and country dwellings in Mississippi to the number of 1,891 were burned last year, causing an aggregate loss of $807,761. The causes for the most part of the fires of this class of risks were: Defective flues, 258; exposure, 313; hot ashes and coals, 119; lightning (not rodded), 60; open fires, 120; coal oil and other explosives, 61; sparks arising from combustion, 118; sparks on roofs, 832; stoves, 71; unknown, 303. There were numerous other causes, but only a few under each head.

Dangerous Wood Enclosed Piers

FOLLOWING a study of the construction of an extensive pier, owned by the New York Dock Company, and the causes that contributed to its destruction by fire on August 20, the New York Board of Fire Underwriters is led to the conclusion that:

"Buildings of frame construction and of large unbroken floor areas, such as this and many other wood-enclosed piers, are serious conflagration breeders and should be protected by automatic sprinklers."

The value of such protection, especially where large values are congested, is self evident, and their installation should be compulsory.

Additional Cities Legislate Against the Dangerous Wood Shingle Roof

MACON, GA., and St. Augustine, Fla., are the latest additions to the rapidly lengthening list of cities throughout the country that, recognizing the fire menace of wood shingle roofs, have enacted legislation prohibiting their further use.

The Macon ordinance now effective reads:

"Section 1. All buildings except those specifically mentioned in Section II of this ordinance shall have roof coverings of standard quality, such as:

(a) Brick or concrete surface.
(b) Clay or Portland cement tile.
(c) Tin or slate.
(d) Asbestos shingles ⅛ inch thick, or thicker.
(e) Pitch or felt, built-up type, four or five plies, gravel or slag surface.
(f) Asbestos-asphalt, built-up type, four or five plies, smooth or grit surface.
(g) Other types of coverings having equivalent fire-resisting properties.

"Section II. All of the following classes of buildings may be covered with coverings set forth above in Section I of this ordinance, or with Standard Asphalt-Rag-Felt prepared roofing, or Asphalt-Rag-Felt shingles, or by other types of coverings having equivalent fire-resisting properties.

(a) Dwellings.
(b) Frame buildings.
(c) Buildings not exceeding two stories or 30 feet in height and 2,500 square feet in area, and not used for factories, warehouses or mercantile purposes.

"Section III. The top of dormer windows shall be covered the same as the roof, or with other material having equivalent fire-resistive properties.

"Section IV. If a wood shingle roof is damaged by fire more than 20 per cent., the entire roof shall be replaced with material specified in Sections I and II of this ordinance.

"If a wood shingle roof is to be repaired for cause other than damage by fire more than 10 per cent. in any one year, the same shall be entirely replaced with materials specified in Sections I and II of this ordinance.

"Section V. The Building Inspector shall have power to condemn and have removed any wood shingle roof that in his opinion is in such a deteriorated condition as to be excessively inflammable.

"Section VI. Within twelve (12) years from the date of the approval of this ordinance any and all roofs covered with wood shingles shall be replaced with roof coverings which comply with this ordinance.

"Section VII. An appeal may be made from any ruling of the Building Inspector to the Mayor and Council in regard to the condemning of roofs.

"Section VIII. All ordinances or parts of ordinances in conflict with this ordinance are hereby repealed."

The St. Augustine Act

The ordinance at St. Augustine was passed as an emergency measure, the authorities deeming its enactment essential for "safeguarding the lives and property of the citizens of said city."

The act as adopted and the arguments that impelled such action are as here set forth:

"Whereas, The City Commission of the City of St. Augustine, Florida, deems it necessary and expedient as a matter of public safety, safeguarding the lives and property of the citizens of said city, and

"Whereas, The City Commission deems that immediate action should be taken by it in the passing of an emergency measure for the protection of its citizens against the fire menace and by injury therefrom, and

Whereas, The City Commission is informed and believes that, by the passing of the ordinance hereinafter set forth, the citizens of the City of St. Augustine, Florida, will be better protected from injury by fire and to their lives and property, within the limits of the city, by prescribing non-combustible roof coverings for the buildings within the City of St. Augustine, Florida, and

"Whereas, The City Commission deems it necessary to reduce the cost of protection against fire and fire menace within the limits of the City of St. Augustine, Florida; therefore,

"Be It Enacted by the People of the City of St. Augustine, Florida:

"Section 1. That from and after the passage and approval of this ordinance it shall be unlawful for any person or persons, firm or firms, association or associations, or corporation or corporations, to erect, build, construct or maintain within the limits of the City of St. Augustine, Florida, any wooden shingle roof, provided, however, that the provisions of this ordinance shall not affect the existing wooden shingle roofs now already built and completed within said city or now under construction.

"Section 2. Non-combustible roof coverings for buildings, within the city limits of the City of St.

Augustine, Florida, is hereby directed and prescribed, and non-combustible roof coverings shall be of such material and design as shall be prescribed and approved by the Southeastern Tariff Association, and no existing wooden shingle roof, within the city limits of the City of St. Augustine, Florida, shall, if damaged more than 25 per cent., be entirely renewed or entirely repaired with other than non-combustible roof covering.

"Section 3. Any person or persons, firm or firms, association or associations, or corporation or corporations violating any of the provisions of this ordinance, upon conviction thereof, shall pay a fine of not less than one dollar nor more than one hundred dollars, or be imprisoned in the city jail for a period of not less than one day nor more than sixty days, or may be punished by both such fine and imprisonment at the discretion of the Municipal Court.

"Section 4. All ordinances and parts of ordinances in conflict with the provisions of this ordinance be and the same are hereby expressly repealed.

"Section 5. This ordinance shall take effect immediately upon its passage and approval.

"Passed in open session by the City Commission, as an emergency measure, on this 31st day of July, A. D. 1917."

Underwriters Begin Campaign Against Hazard

So serious is the wood shingle roof hazard considered by fire underwriters that they have undertaken a determined campaign to induce legislation looking to its prohibition everywhere.

The insurance men cannot be accused of having a selfish interest in preferring any special form of roof covering; their only concern being the abolition of a practice that has, through a long series of years, proven so destructive to life and property.

Bangor, Maine; Chelsea and Salem, Mass.; Hot Springs, Va.; Nashville, Tenn.; Paris, Texas; Augusta and Atlanta, Ga., have, within the past few years, suffered enormous fire loss through their toleration of the combustible wood shingle roof, and, profiting by the experience of the cities above named, numerous communities in all sections of the United States now forbid absolutely the further use of any save incombustible roofings.

Cities Menaced by Wooden Roofs

Fire protection engineers fail to understand why such otherwise progressive centers as Providence, R. I., Syracuse, N. Y., and Haverhill, Mass., continue their toleration of wooden shingles for roof coverings, menacing thereby the fire safety of their respective citizens.

At Providence strong efforts were made several years ago to do away with and prohibit shingle roofs, but the local lumber interests were too strong and the shingles continue to be used. In a city of this old style construction and congested narrow streets, heavy penalty charges should be put on shingle roofs. It is only a question of time before the fire comes. In this district there are many sprinklered risks, which are seriously jeopardized by the frame, shingle roof construction.

How Insurance Men View the Situation

From the comment of a number of prominent fire underwriters who have recently expressed their views upon the wood shingle roof menace, we quote the following:

Only Remedy Through Legislation

John O. Platt, vice-president of the Insurance Company of North America, Philadelphia, holds that the only effective way to deal with the situation—which, it is well known, has caused a very large amount of loss in the aggregate—is by means of legislation prohibiting the use of such roof covering. In due course the fire loss would then be reduced and fire insurance premium charged correspondingly.

Particularly Serious in the South

A menace everywhere, Manager E. G. Seibels, of Columbia, S. C., asserts that the wood shingle roof is one of the most serious hazards that we have in the South, and is being daily increased as buildings are being brought closer and closer together by the increase in population. I can recall very well, as a boy, that I wondered how my home town would ever grow without spreading over half the State, as the idea prevailed then that every man should have at least an acre of ground. To-day, on this same acre of ground, there are not less than four, and sometimes six and eight, houses, all covered with shingle roofs. This, in many towns, has not only increased the conflagration hazard from a broad standpoint, involving the whole city, but in a small way it is the rule, rather than the exception, that a fire in a dwelling communicates to at least one or two other buildings. Summing up the situation, I think the following points cover the real difficulties to be met:

(1) The active antagonism of lumber interests must be overcome. This can only be done through an educational campaign with municipal authorities, coupled with a suitable advance in rate.

Rate Advance Advocated

An effective deterrent to the continued use of wood shingle roofs, in the opinion of R. T. Caldwell, manager of the South Carolina Inspection and Rating Bureau, would be a further and pronounced increase

(Concluded on page 74)

Handling Cement in Bulk

As a container for Portland cement the wooden barrel is almost a thing of the past. The cloth sack and paper bag are similarly out of place on many construction jobs and in most plants where concrete products are manufactured.

The shipment of cement in bulk is neither new nor revolutionary. It is the simplest and the least expensive method of getting cement from the manufacturer's bin to the job. Bulk cement was first used about 30 years ago, but shipment in this form was not extensive until 1912. Then several contractors saw the possibilities of making a saving by handling their cement in the same manner as sand, pebbles and crushed stone. Their success has led to a marked increase in the shipments of cement in bulk. There is every probability that in the near future the use of cement in sacks on large construction jobs, in cement products plants and even on many small pieces of concrete work will be exceptional.

Not every job is adapted to the efficient use of bulk cement. Cement will always be retailed in sacks, but sacks should not be used when their use can be avoided. The cement user is the one who pays for this comparatively expensive means of handling cement. Cement must be reduced to bulk before use at the mixing plant—why put it into a package, only to empty it from the package on the job?

Nor is the consumer the only one who saves money by handling cement in bulk. More cement can be loaded with the same labor, which is an important item in times of labor shortage. There is a saving to cement companies since loading is less expensive and sack inspection and repair are eliminated. This saving is turned over to the consumer by reducing the net price on his cement.

The big saving, however, is not in the original cost of the cement. Cement in bulk saves money because there is

No sack loss.
Less labor from car to mixer.
No labor to count, bundle and return cloth sacks.
No bookkeeping on sacks.
No valuable space used for storage of sacks.
No fire insurance to pay on sacks in storage.
No hauling charges or freight to pay on sacks returned.
No interest to pay on money tied up in sacks.

Sack Losses

Rejections of cement sacks returned to the mill by customers vary from 1 to 5 per cent. Education of workmen by contractors and dealers has resulted in largely reducing rejections, but care can only prolong the life of a cement sack and not prevent its final wearing out. The consumer pays for every wornout sack and an average cement sack makes about 8 trips; this means that the 10 cents per sack which the consumer pays for sacks worn out, lost, etc., amounts on the average to 1¼ cents per sack, or 5 cents per barrel, on all cement shipped him. This may not be apparent at first glance, but if sack accounts are checked up, it will be found that loss in sacks rejected, worn out, stolen and otherwise unaccounted for usually amounts to over 5 cents per barrel. The number of sacks not accounted for varies with the class of work.

Plants in which concrete products, such as block, fence posts, pipe, piles, roofing tile, etc., are manufactured have a better opportunity to control the sack problem, since the work is done under roof and with the constant supervision of the foreman or manager. But under any circumstances, unless vigilance is used, the workmen will put the cement sack to various uses, the cost for which will run into a considerable total in a year's time.

Labor in Handling Cement

Cement in cloth sacks must be carried, sack by sack, from the car, storage shed or warehouse to the mixing platform, where each sack is untied and emptied into the mixing hopper. Each sack must then be shaken and thrown in a pile far enough from the mixer to avoid getting wet. From time to time during the day or at the end of the day's work, the sacks are taken to the warehouse, where they must be counted, sorted, piled and tied in bundles and space provided for their temporary storage. The bundles must then be hauled to the freight station, requiring labor and teaming charge. Freight is paid on the empty sacks to return them to the cement mill.

An empty sack weighs seven ounces. One hundred new sacks weigh about 44 pounds, but a bundle of 100 old sacks weighs about 80 pounds. The additional 36 pounds represents cement left in the sacks which the customer does not use and pays freight on to return to the cement company. Freight on returned sacks will average about 10 cents per 100 pounds.

Interest on Investment

The customer is required to pay for cloth sacks or paper bags. Credit on cloth sacks returned is not given until they are received, which is usually 30 to 90 days after the cement is shipped. The cost per barrel which must be allowed or the money tied up in cloth sacks represents a useless investment, while the money paid out for paper bags is an absolute loss. By some, the interest on money tied up in sacks is found to be as high as 1 cent per barrel and this investment in sacks idle for a period of 30 to 90 days prevents the use of the money for some other purpose.

Class of Work on Which Bulk Cement Has Been Used

Bulk cement was first adopted on contracts where cement was used in large quantities at a location near a railroad siding. On these jobs, cement was transported by wheelbarrow direct from the freight car to the mixer. Successful use on several such contracts interested railroad engineers and railroad contractors who very shortly began using cement in this form on track elevation and other miscellaneous construction work. Large building contractors were next to fall into line, but in nearly all instances cement was used direct from car to mixer, and for that reason the idea became prevalent that bulk cement was suitable only on centrally located jobs where cement was used in large quantities. Such, however, is not the case.

Concrete products plants making pipe, piles, posts, blocks, etc., were soon interested in bulk cement efficiency and this class of consumer was quick to grasp the opportunity. Now, sewer construction, concrete street work such as sidewalks, curbs and pavements, and even concrete roads a considerable distance from railroad siding are among the jobs on which bulk cement is being used. There are few classes of work other than the retail trade of the material dealer on which bulk cement cannot be handled successfully.

Methods Employed

On most railroad work no special facilities are necessary, and cement is wheeled direct from car to mixer. This method will also be found suitable for large construction jobs such as dams, factories, power plants, etc., when car supply is regular, but in times of irregular car supply and high demurrage charges, a bin should be constructed for the storage of cement on the job. This bin should be so located that there is the least possible labor required for unloading cement into the bin and conveying it from the bin to the mixer.

Concrete products plants will find economy in constructing a bin with or without conveying machinery, depending on size and layout of the plant. On street and road work or where the job is not on a railroad siding, cement may be hauled in tight bottom or dump wagons from car or warehouse to the work, where it may be unloaded into storage boxes or used direct from the wagons.

The question may arise as to what is to prevent the cement in bulk from being damaged by rain, but it must be remembered that sacks do not keep cement dry and when a sack of cement gets wet there is not only a loss of cement, but the sack also becomes useless. Moisture penetrates rapidly through sacked cement by capillary action in the cotton, whereas with bulk cement the loss is limited to the cement actually getting wet. With bulk cement in a given case of leaky roof, there will be one lump of set cement weighing 50 pounds: with cement in cloth sacks in the same case, there will be 50 pounds of set cement; but it will be in 20 sacks, the sacks as well as the cement being damaged.

Unloading Bulk Cement

Unless the railroad siding is well above the floor level of the storage bin, some form of bucket elevator or conveyor is desirable to elevate the cement into the bin quickly and with minimum expense. Such equipment may be obtained from one of a number of manufacturers, several of whom have designed special machinery for this purpose. The cement may be shoveled by hand to the elevator boot or a power shovel used to unload the car in the same manner as a grain car is unloaded. Seven to 10 horse-power is required for unloading 200 barrels in three hours by means of a simple bucket elevator and power shovel. If greater speed is desired a larger shovel and faster elevator requiring correspondingly more power may be installed.

Handling and Measuring Bulk Cement

The size and character of the job will determine what method should be used for measuring and handling the cement.

For large construction work using concrete from a central mixing plant, the cement is drawn from the storage bin into automatic weighing or measuring hoppers, from which it is delivered to the mixer. In some instances belt or screw conveyors are used for delivering cement to the charging hopper.

For jobs which will not justify the expense of such equipment, measurement in wheelbarrows or bottomless boxes set in wheelbarrows will be found satisfactory.

In a concrete products plant, it is possible to work out methods for handling all of the materials mechanically. For handling bulk cement, the drag conveyor, belt conveyor, screw conveyor, or bucket elevator are commonly used. Wherever labor can be eliminated by use of conveyors, additional savings should be credited to the account of bulk cement. If the volume of cement handled is small, it is probably unwise to install expensive equipment. Some cement products plants are using bulk cement, handling it in measuring boxes or wheelbarrows in the same way as sand and stone. If the volume of business is large enough to justify the use of conveyors for the aggregates, the same manner of handling cement will usually be found desirable.

Arrangements for handling bulk cement on roads and pavements are usually about the same as for handling cement in sacks. It may be transported to the work direct from cars to warehouse in wagons, automobile trucks or trailers, where it may be used direct from the conveyance or dumped into storage boxes.

Fire Prevention Consecration by War

YOU can't continue to eat if you continue to burn up the food!

Therefore, if you want to eat—and to continue to eat—prevent the fires that are destroying vast stores of the country's food products every day.

These are the salient thoughts of a letter recently sent out by L. J. Cunningham of the Glens Falls Insurance Company to its agents and the insurance fraternity.. Mr. Cunningham emphasized the fact that the duty to serve cannot be delegated. "U. S. stands for the United States," he said, "but it spells US, and with a very distinctive spelling when 'A State of War' arrives."

Wherefore—Use your war-stimulated earnestness and quickened sense of duty for serving your country in a consecrated effort for prevention of loss by fire * * * make incendiarism as odious as treason and careless indifference to fire prevention requirements as nothing less than criminal.

Mr. Cunningham's letter is a clarion call to individual service—personal assumption of personal responsibility for fire waste, howsoever caused and whatsoever it affects, but with particular reference to the prevention of food wastage by fire.

His call is to the agents of this company first, to the fire insurance fraternity second; but it applies with equal force to every man and woman—even every child—that handles or in the remotest degree is responsible for created values, whether created by man's handiwork or produced as the result of his labor.

What are you going to do about it?

The letter follows:

In the stress which confronts our country we have also the recognized importance of the individual, the quantity and quality of the personal obligation of every citizen, which in less strenuous times is overlooked or ignored. It is not a time when personal responsibility may be left to parties, societies, officials, aggregations, etc., which in "piping times" of peace and prosperity is too much our habit. Each must now follow the flag for himself—we cannot avoid or delegate our duty. U. S. stands for the United States, but it spells US, and with a very distinctive spelling when "A State of War" arrives.

It is a favorable feature of war-test, this renaissance of the individual. Boys at once become mansize; the careless and indifferent become soberminded; the sober-minded become serious and the serious become intense. The man-unit reaches its best and thus the whole people become like a tuned piano with every wire at tone tension. Insurance men are sure to respond to the preparedness requirements of the situation, and they know as well as any what is needed to insure the safety and honor of the country. All will not be called to the colors, but all will be called to share in the duties and burdens of the times. * * *

Never before in the war experience of this country has there been such anxiety for our food supply, and never before has there been so much reason for this solicitude. There is abundant evidence that we are going to be hungry! In fact, this question of food supply is the great feature of the awful European war and it will have an important if not decisive influence upon the outcome. Throughout our country the danger is being understood and the demand has gone forth for the fullest product which the land can be made to yield. There must be no idle lots or acres or tillers of the soil—for food supply takes prominence over munitions.

Equally important with food production is its conservation, the saving for actual use. Scores of food-laden vessels have been sunk at sea by the vicissitudes of war and enormous quantities have been lost by fires on land from vicissitudes that you know all about. We may not diminish continued loss by war, but there can and must be salvage from the loss by fire. What avails it if thousands of acres are sown and harvested if the product be destroyed in such elevator fires as have recently occurred, one of them involving a million bushels of grain? Not only grain in elevators, but grain and flour in mills and warehouses; meats in cold storage and packing houses; food in wholesale and retail groceries, canning and provision establishments—in fact, few fires occur without the loss of foodstuffs now so potentially precious. That there was insurance cuts no figure, for you cannot eat money. * * *

In behalf of our mutual business and the higher motive of patriotism, it occurs to us to suggest that you us your war-stimulated earnestness and quickened sense of duty for serving your country in a consecrated effort for the prevention of loss by fire in your business territory and plan a campaign which will make incendiarism as odious as treason and careless indifference to fire prevention requirements as nothing less than criminal!

You have the ability, the knowledge and the experience; you have the confidence of your clients and acquaintances, and you have behind you the critical need of your country in conserving the supply of food. You know where fire dangers exist and what improvements are needed. This is no small matter at any time, but is much emphasized just now and is worthy of your determined undertaking according to plans which are best calculated to bring results in your respective localities. Enlist the interest of your competitors, your fire department, your good citizens, your local press, and arouse your community to the prodigal wastage of fire, which can easily be lessened. We are sure that if the insurance men of this country were conscious of how much they could do in this behalf and made that consciousness active along lines in which they are well informed, our shameful annual ash-heap would diminish, rates of insurance would decrease, a patriotic service would be rendered and an important contribution to the food supply of the future would be made.

There is no gainsaying the importance and timeliness of this plea. The country is not yet awake to the fact that we are at war. The sound of the guns is afar off and it is on the other side of the world that men are dying. Yet millions in value—including millions of value in food—and hundreds of lives have been destroyed here at home in the carrying out of a warfare as real as that raging from the English Channel to the Swiss frontier and as bitter as that which has filled the gloomy chambers of stormy seas with uncounted dead.

And all because there has been, in this country, no adequate system of prevention, no well-planned method of protection, no general adoption of sound principles for the accomplishment of fire extinguishment.

Individual responsibility is a burden on all of us; but it bears with compelling force on those whose properties are destroyed, and particularly those elevator, grain mill and food warehouse men who are trustees for the people in handling the food which, if we would live, we must have.

It is up to them to remove every hazard that is removable from their business; and Mr. Cunningham's call to insurance men is to those best fitted to aid and guide these trustees in thus safeguarding the food supply.

It is up to them to provide every possible means, method and facility for protection against both external and internal hazards; and here again the insurance men of the country can perform invaluable service.

And, above all, if works and devices and systems and methods of prevention fail, there is the last-trench defense of fire extinguishment. From the very nature of the problem—food conservation—it is necessary that this be accomplished with the least possible loss or damage, which presupposes immediate detection of fire at the point of origin, immediate alarm to outside fire-fighters that fire exists, and immediate setting to work to extinguish it. This means that these functions must be automatically performed to be of the highest service.

Fire prevention, therefore, for the removal of causes; fire protection for the safeguarding of properties and processes, and sprinkler equipment to meet the exigencies of the situation if—despite all precautions—fire develops—these are the elements of the personal responsibility that must be shouldered by the food handlers of the country

What are you going to do about it?

* * *

Overweighing is Expensive

THE April number of The Atlas Almanac, published by the Atlas Portland Cement Company, contains an interesting article by Dr. F. Reichmann, former New York State Superintendent of Weights, upon the value of accurate weighing to the retail dealer, says *Rock Product.* He says that many dealers are losing a big margin of profit by overweighing, declaring that a 3 per cent overweight is by no means uncommon. The dealer who has a scale that registers 3 per cent overweight and does an annual business of $100,000, with a net profit of $6,000, loses 3 per cent of $100,000, or $3,000 on his annual business. Instead of making $9,000, as he would with a correct scale, he loses one-third of the profit that should be his.

How to Test Truck Scale

Dr. Reichmann gives the following method of testing a wagon or auto truck scale:

"Does the beam vibrate smoothly or evenly without jerking motion? If not, something binds or touches. Does it move up and down four or five times before coming to rest? With a heavy load on the platform balance the scale, then slide the poise forward 10 pounds. This should throw the beam down against the trig loop. If it does not, something is wrong. Move the auto truck or wagon off the scale and have it come on the scale again from the other side. The reading should be the same and again 10 pounds should throw the beams decidedly up or down. Put 1,000 pounds of correct test weights on each corner and see if the beam accurately records the 1,000 pounds with the poise or with the counterweights, if counterweights are used. Does the scale hold its balance? If any of these tests fail, the scale is out of order and needs attention."

MEMBERS of the South Dakota Association of Fire Chiefs, at their annual gathering held lately were given an illustrated lecture upon "electricity as a dangerous fire cause, and the proper means of safeguarding against it."

Fire Tests of Building Columns

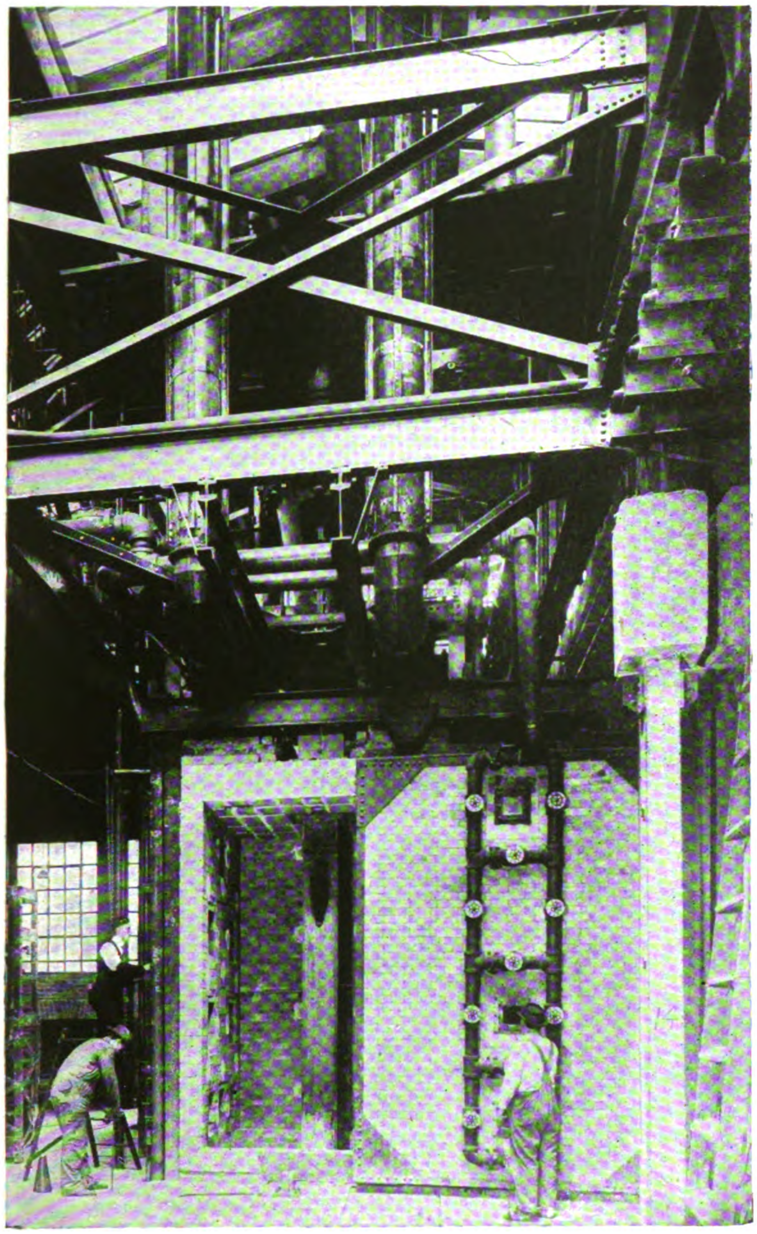
To determine the fire-resistive properties of building columns, a series of tests is being conducted at the Underwriters' Laboratories, at Chicago, under the joint direction of the Associated Factory Mutual Fire Insurance Companies, the National Board of Fire Underwriters and the Bureau of Standards of the Department of Commerce.

The first test was run on June 28th last, and it is planned to have two each week throughout the remaining twelve months.

Underwriters, engineers, architects and others having a proper interest in the subject are cordially invited to visit the Laboratories while the tests are in progress.

Careful records will be made of each test and the results analyzed by experts, whose findings will be of the greatest interest to the building world.

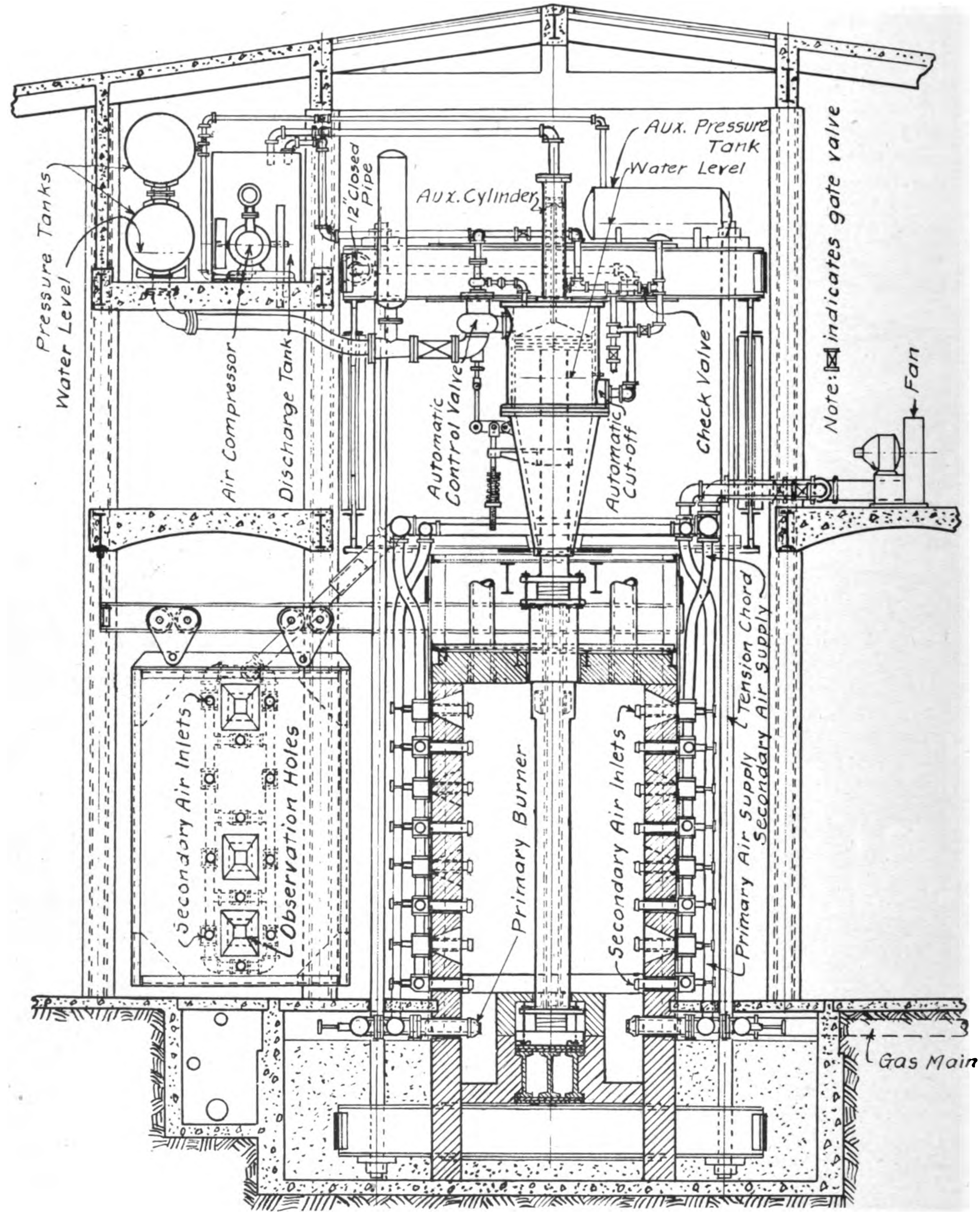
Through the courtesy of the management of the Underwriters' Laboratories we are able to present herewith a summary of the tests proposed; the methods employed, together with a view of the apparatus used in the work; also a sectional view of the testing machine.



General View of the Apparatus Used by the Underwriters Laboratories for Testing Building Columns

Apparatus

"The apparatus used in the tests is especially de-



SECTIONAL ELEVATION OF TESTING MACHINE

Scale: $\frac{3}{16}$" = 1'-0"

signed for the purpose, and consists of a carriage and traveling crane for handling the test samples, a furnace in which the columns are subjected to fire, a hydraulic ram and restraining frame by means of which the loads are applied to the columns, apparatus for measuring the temperatures of the furnace and the test samples, apparatus for measuring the deformation of the test samples and a flexible nozzle by means of which streams of water are supplied in the Fire Stream Tests.

Types of Columns and of Column Protection

"The types of columns being tested include rolled steel sections, built-up steel sections, round cast iron section, steel pipe filled with concrete and vertically reinforced and hooped concrete columns, to which it is proposed to add several wooden columns. At least one of each of the sections is unprotected; others are partially protected by concrete and others completely protected by various thicknesses of concrete, clay tile, filled and unfilled, gypsum blocks, plaster on metal lath and common brick, in accordance with the methods commonly employed in practice.

"The tests on unprotected columns are made to furnish information as to the ability of the columns to withstand fire and to obtain information relative to the influence of the type of column section, which latter forms a basis for comparison of the various methods of column protection.

"Columns partly protected by filling the re-entrant portions with concrete are introduced as a type made necessary where space limitations prevent the use of full protection. Besides giving information on the merits of this type of protection as compared with unprotected steel, cast iron and wooden columns, it is also thought that they will give further data on the influence of type of steel section on fire resistance.

"Of the twenty-four tests devoted to full concrete protection, the eight made on the Rolled H section employ, with three exceptions, all of the concrete aggregates used in the full series of tests. This is done to give a comparison between the Rolled H section and the other sections with the same thickness of covering made of the same aggregate, and also to compare the efficiencies of the various concretes in point of heat insulation and fire resistance.

"The reinforced concrete tests, consisting of three vertically reinforced square columns, three vertically reinforced round columns, and three spirally hooped and vertically reinforced columns, are designed to show the effect of shape of column, and also the effect of type of reinforcement on fire resistance.

Materials

"Materials used in the construction of the test columns and protective coverings have been obtained from various sources and from various sections of the country. They have been selected with a view of obtaining those representative of their respective classes.

"The column coverings have been applied by experienced men in accordance with plans and specifications drawn to secure average results obtained under ordinary commercial conditions.

Sequence of Tests

"The following shows the probable sequence of Fire and Fire Stream tests classified according to types of coverings:

Fire Tests

Partial concrete protection	9 tests
Full concrete protection and reinforced concrete	30 tests
Plaster on metal lath	5 tests
Filled pipe columns	4 tests
Clay tile	18 tests
Gypsum tile	5 tests
Common brick	2 tests
Timber columns	4 tests

Fire and Water Tests

All types	13 tests

"No schedule has been decided upon for testing unprotected columns, it being the present plan to test them as opportunity affords.

Test Methods

"In all of the tests, except those in the Fire Stream series, it is proposed to expose the columns while under working load to a predetermined furnace temperature rise until the specimen fails. In the Fire Stream tests the fire will be built up at the same rate until a desired temperature rise in the furnace is attained, when water will be applied."

To reduce the Nation's fire loss through the erection of proper buildings and equipping their contents against fire, is not only business sense, but a patriotic duty.

A National Building Policy

PART III.

(*Continued from July Number*)

Attitude of Europe Toward the Question

THE Europeans say that a person has no right to endanger adjoining properties by permitting his own to burn, and frame their laws accordingly. They hold a man responsible for the loss incurred by his neighbors, but they go further and make him pay for the cost of extinguishing the fire on his own property. Furthermore, in Continental countries, the insurance companies are not permitted to pay losses until government officials have made a survey and issued a permit for the loss to be paid to the insured.

We do not know how far in this direction public opinion in America would sanction, but we do believe that our National Building Policy should provide for the enactment of adequate legal safeguards to the neighbors and community, so that carelessness and arson should be made to pay proper penalties.

A Basic Building Code

The mapping out of a National Building Policy provides the plan and purpose of an universal building code. It is, then, logical that such a code should be drafted embodying all the principles of the National Building Policy. This code should not be elaborate but deal as far as possible only with basic principles and not be written as an exhaustive building treatise.

It should allow the designing engineer or architect to apply these principles. Such a code would be elastic and fitted to meet changing conditions and the use of new materials and methods.

The code should be adopted by cities and states as rapidly as its acceptability was demonstrated with the purpose of eventually bringing about uniformity of building code legislation in the cities and states of our country.

Annual Fire Prevention Conventions

Powell Evans, of Philadelphia, pointed the way in 1913 by calling a National Fire Prevention Convention. The public interest could be kept alive by the holding of such conventions each year, which should receive government support to the extent that the Government should be asked to defray the cost of conducting each convention and of the printing and distribution of the proceedings.

Supposing this cost the Government $50,000 per year. Imagine the money value to the country—not to speak of the lives saved—that would accrue by bringing together each year all the experts in the country to discuss methods to improve building conditions and to lessen the fire loss! Such conventions would be attended by representatives from Federal Departments interested; from scientific, engineering and architectural societies; from cities and states; fire underwriters, manufacturers, contractors, real estate interests, fire underwriters and representatives from foreign countries.

Each year the progress made could be noted, discussed and acted upon; each year a fuller and wider understanding of the National Building Policy would be had and would strengthen the purpose of the people to demand better conditions in their buildings.

An annual convention under Government auspices would be productive of untold good and is a form of support which the Federal Government could well afford to give. The National Building Policy includes the holding of a Government-aided Annual Fire Prevention Convention in a different city each year as a recommendation.

This recommendation for the holding of a Governmental conference or convention each year will probably be criticised from the standpoint that it might conflict with the annual meetings which are held by different National bodies, and that it would place a tax upon the time of many men in the country who invariably attend the gathering of such bodies. The suggestion has, therefore, been offered that in place of an annual Government-aided convention being held that perhaps continuous all-the-year-through conferences between these National bodies would accomplish the same purpose and would render close co-operation a National habit, and that in this event the United States Bureau of Standards might be used as a clearing house.

Suggestions have been made at different times that the Federal Government should establish a separate Government Department of Public Works. If such a highly desirable action was taken by the Government, it would at once furnish the proper instrumentality to act as a clearing house and would, if such a department should adopt a National building policy, give National sanction and impetus to such policy.

A Proposed National Building Policy

In the foregoing discussions in this article and the first articles which appeared in the June and July numbers of CONSTRVCTION we have led up to a definite statement of the principles and constructive program which we believe should in its entirety form our National Building Policy.

CONSTRVCTION advances this as a basis for intelligent and constructive discussion and criticism and sincerely hopes that the discussion will be provoked so that a National Building Policy may be thus evolved which will merit and receive the support of all in our country and, by its general use, secure better building conditions and a great reduction of our national fire loss.

We present a proposed National Building Policy as follows:

1st—Abandonment of the use of the word "fireproof" in general and technical vocabularies.

2nd—Use of the terms "fire-resisting," "fire-resistive," or "fire-resistant," to denote this qualification in materials of construction and in completed buildings.

3rd—The classification of materials of construction and parts of construction in accordance with their relative ability to withstand fire.

4th—The standardization of methods of conducting fire tests.

5th—The establishment of tables giving suitable fire tests for structural materials and parts of construction for high, medium or low fire-resistive values.

6th—Designating completed buildings by the word "class" to indicate the occupancy or uses for which the building is constructed or to which it is put.

7th—The grading of completed buildings in each "class" in regard to the materials used in their construction and how these materials are assembled, with consideration given to the general design and cut-offs in horizontal and vertical directions.

8th—The grading of completed buildings in each "class" in regard to materials used and how used and the measures of protection installed or employed for the protection of both the building and contents into three or more grades.

9th—The establishment of general specifications for the construction of buildings in each "class" and in each of the grades of completed buildings.

10th—The classifying and naming of ordinary frame buildings having combustible finished roofing and exterior wall surfaces as "combustible."

11th—Urging upon states, cities and communities the amendment of existing building laws, which are inadequate to protect their respective communities against the conflagration hazard, due to the menace of readily combustible finished roofings and exterior wall surfaces by compelling existing and new buildings to be so remodeled or constructed as to prevent the passage of fire from within to without and vice versa.

12th—The making compulsory of the use of automatic sprinklers, automatic fire detectors and other automatic fire protective devices in all buildings containing inflammable contents and where people work or congregate.

13th—The making compulsory of the use of the fire wall and adequate enclosures of vertical openings in all buildings containing inflammable contents and where people work or congregate.

14th—The making compulsory of adequate horizontal and vertical exits in all buildings where people work or congregate.

15th—The making compulsory of the covering of the lower tier of joists and the inner surfaces of wood framing of roofs in used attics in joisted buildings with incombustible lathing and plastering or other suitable fire-resisting surfacing material.

16th—The urging upon fire insurance rating authorities the formulation and adoption of uniform rating schedules to be standardized in harmony with the National classification of materials and use of standardized test methods.

17th—The urging of liberal appropriations by the United States Government to various Federal departments and bureaus who are engaged in or have facilities for developing information regarding the best use of structural materials.

18th—Urging upon the United States Government the granting of such appropriations as would permit federal, state or city executives, manufacturers or users of materials or types of construction to secure Government conducted fire and other tests at the public cost.

19th—Urging upon all scientific societies, fire underwriting bodies, engineering schools, colleges and universities and the different competent bureaus of the United States Government close co-operation in developing new information and accumulating existing information regarding the physical characteristics of structural materials and types of construction, so that such information may be published from time to time as United States Government bulletins for the use of all interested.

20th—To bring about in populous communities the adoption of zones of danger wherein rules reasonably limiting and regulating the presence of hazardous occupancy or conditions may be established and enforced with due regard for the present and prospective congestion of life and property in such areas.

21st—The licensing by competent authorities of every new and changed occupancy so that the "class" of the building may be correctly designated at all times.

22nd—That the property owner is legally responsible for damages resulting from fire originating on his premises and the expense for extinguishing such fire. Laws based upon this principle have been enacted in one state and should be generally adopted throughout the country.

23d—The holding annually of a National Fire Prevention Convention in a different city each year, under the auspices of the National Government, which should be urged to appropriate the necessary funds for conducting and publishing the proceedings of such conventions, to which would be invited representatives from all the federal, state and city departments, manufacturers, scientific and technical societies, fire insurance underwriting bodies and all others interested in the question of proper building construction and a reduction of the national fire waste.

24th—The urging upon the United States Government the establishment of a Federal Department of Public Works charged with the duty of formulating a National Building Policy, to act as a clearing house for all information regarding structural matters and to solidify sentiment and purposes in the advocacy of a lessening of the National fire waste.

25th—The formulation of a basic, fundamental building code through broad co-operative effort, embodying in such code the classification and standardization of structural materials and completed buildings as outlined in this National Building Policy and urging upon states and cities the adoption of this basic fundamental building code, so that uniformity of practice in building law legislation may ultimately be attained throughout the country.

Ways and Means of Providing Workmen's Houses

(Continued from last month's issue)

THE appreciation in land values that will accrue throughout the community that makes itself an attractive place to live in through the elimination of slums and the creation of picturesque dwellings.

And all of these men can be shown that what benefits the community as a whole must benefit them individually.

While adequate subscriptions are necessary, the money furnished does not need to be entrely a gift. Workingmen's houses can generally be financed so that the money is refunded at a low rate of interest in some fifteen years. While this would not be attractive solely the community at no ultimate cost, but with large ultimate gains. When this is done, when the money representing the equity is raised, the crisis has been passed. After this it is downhill on all sides.

The Specialist's Share in the Work

The preparing of working drawings, the taking of bids, the placing of the first mortgage, the purchase of the land, the awarding of the contracts and the building of the houses—all of this specialists, whose business it is, can do. But beware tne semi-specialist, the man who says the practical is the only consideration and who would build drygoods boxes on end or long rows of monotonous houses like an interminable freight train. Beware equally the man who is all artist and who provides the beautiful at a cost that is prohibitive to the people who must occupy the houses. Beware also the man who does a thriving business by selling poorly built houses to the ignorant and who vanishes before the buyers become educated.

But seek the man who can foresee the needs of the future, who can picture your town as it should be ten or twenty years hence, who knows what can be successfully done and what cannot, and who can create real values.

To successfully provide workingmen's houses for any community, civic devotion, money and expert knowledge are necessary. The first you must be born with, the second you must get, and the third you must employ.

But at each progressive stage couple action with the preparation for action. Don't let action lag. While you are holding meetings and discussing the need of houses, employ an expert to tell you what to build. While he is studying the problem and educating the public, take options on your land. When the report and recommendations are published, have a vigorous money-raising campaign. While plans and specifications are being made and bids are being received, place your first mortgage, and, lastly, while the houses are being built, rent them and sell them.

We are largely creatures of habit—Get the habit of building for permanency, and thus add to the National wealth.

A Department Devoted to the Use of

AUTOMATIC SPRINKLERS

Edited

IRA G. HOAGLAND, Secretary PAUL MASON, Special Representative

National Automatic Sprinkler Association

Creating Fire-Safe Food Storage

SAFETY from fire depends on construction and equipment; these in turn on design, and design is the province of the architect or engineer. So far as buildings are concerned, therefore, the creators of them are the keystone of the arch of safety.

At the present monthly rate—more likely to increase than to decrease, unless energetic action is taken in safeguarding and drastic repression is exercised against incendiarism—$25,000,000 worth of the Nation's food supply will be destroyed this year in the three classes of grain mills, grain elevators and food warehouses, including packing houses. Regardless of initial causes—whether preventable, unpreventable or incendiary—the *extent of this loss is largely due to faulty construction and inadequate protection.*

Virtually all buildings housing enterprises of these classes are large enough, are important enough in times of normal business conditions, and are so vital to the National well-being under present circumstances that their design, construction and equipment should be put under charge of the most skilled and competent architects and engineers; they can eliminate faults on construction and recommend adequate protection.

There is much new construction in these classes, owing to natural growth of the country and increase of farm products; and also due to necessity of replacement of mills, elevators and warehouses destroyed by fire. There is a vast field of activity, therefore, for architects and engineers, material men, builders and equipment men, without going outside these classes. Owing to the large amount of incendiarism, it is virtually an addition to the field already existent and growing.

What Is Burning?

An analysis of the burning record demonstrates the breadth of this field, the vital necessity for this effort. As no individual loss in the following citations falls below $10,000, the aggregate probably falls far short of the total:

Elevators.—During May, June and July, 16 grain elevators were destroyed, losses ranging from $10,000 to $700,000, and with an aggregate loss of $2,772,200—an average loss of $180,000.

If these elevators had been properly designed and adequately protected they could have been saved, probably in spite of incendiarism—the initial cause of many of these fires. Chief M. A. Little, of the Rochester (N. Y.) Fire Department, speaking of a $700,000 elevator loss in that city, said:

"If the elevator had been sprinklered it would have been saved. All grain elevators should be sprinklered."

Grain Mills.—During May, June and July, 11 grain mills burned, with an aggregate loss of $417,800—an average of $33,000. There is no industry in which correctness of design is more essential than in the milling industry—a responsibility that clearly rests on the architect.

Food Warehouses (including packing plants).—In May, June and July 35 establishments in this class were wiped out of existence. The total loss was $2,302,000—an average of $65,800.

Concealed spaces and unprotected vertical openings are frequent and potent causes of disastrous spreading fires in these establishments. They can be readily eliminated in designing buildings. If automatic sprinkler protection is insisted upon, in addition, the buildings will be safe.

Sprinkler Efficiency Established

In flour and grist mills in 20 years automatic sprinklers have extinguished 41 fires out of 73, or 56.2 per cent; held 26 in check, or 35.7 per cent; a total satisfactory control of 97.8 per cent, and control has been unsatisfactory in only six instances, or 8.2 per cent.

Of these six, fire starting in unsprinklered portion was the cause of one; concealed spaces of another; sprinkler crippled by explosion, two; exposure or conflagration, two.

The last and the first two—or four out of six—were clearly within the provision of the designers of the buildings.

Elevators.—20 out 52, or 38.5 per cent, extinguished; 17, or 32.7 per cent, held in check; total satisfactory control, 37, or 71.2 per cent; unsatisfactory control, 15, or 28.8 per cent.

Analyzing the record of unsatisfactory control, three were due to unsprinklered portions; two to concealed spaces and vertical openings, and two to exposure or conflagration.

Warehouses and Packing Plants.—234 out 358, or 65.4 per cent extinguished; 113, or 31.8 per cent, held in check; total satisfactory control, 347, or 97.2 per cent; unsatisfactory, 11, or 2.8 per cent.

Of the 11 in which unsatisfactory control is recorded three were due to unsprinklered portions and one each to concealed spaces and vertical openings.

The architect, or engineer, therefore, with reasonable certainty, could have assured the safety of 16 out of these 27 plants in which sprinkler control is recorded as having been unsatisfactory. If this is true of the sprinklered plants, how much more likely it is to be true of plants that are not sprinklered that their designers could be the deciding factor as between safety and disaster—*if they only would!*

Materials and Construction

None except fire-resistant materials should be used in construction; and if plants are beside or near railroads, special attention should be given to roofs and exterior openings. Spark arresters should be provided at all windows and doors, and roofing materials should be approved by the Laboratories.

Careful attention should be given to fire walls and openings therein; elevator (freight or passenger) shafts should be properly enclosed. In mills and elevators arrangement and construction of boots and heads should be under careful scrutiny.

In short, none but the best materials should be allowed, and none but the the most skillful construction methods, conscientiously enforced, should be employed.

To these should be added complete fire protection equipment, of which the automatic sprinkler is chief; and absolute cleanliness—unceasing vigilance against fire, with watch service especially directed against incendiarism should be the rule—a law like that of the Medes and Persians, that changeth not, nor is to be evaded or disobeyed.

Rapid progress is being made in the construction of a 1,600,000 bushel addition to the public grain elevator at New Orleans. The contractors for the work are Janse Brothers, Crain and Howe of the Crescent City.

J. Williams has been appointed engineer in charge of safety and sanitation of the Wisconsin Industrial Commission, his department embracing factory, building and boiler inspection and fire prevention. Mr. Williams was formerly State Building Inspector at Milwaukee under the Commission.

Legislate Against Wood Shingles

(*Continued from page 62*)

in the fire insurance rate for the added hazard. In part, Mr. Caldwell says:

"A service of eighteen years in the field for the companies, as well as the Southeastern Underwriters Association, has afforded me opportunity, both by actual experience with inspection and adjustment of losses, to justify my opinion that this is unquestionably one of the greatest hazards we have to contend with in the South. This would apply not only to individual risks, but especially to the conflagration hazards in the larger cities. Of two conflagrations in the South, especially Atlanta and Augusta, Ga., they were unmistakably caused from wooden shingle roofs, assisted very materially by strong winds. As evidence of the existence of the conflagration hazard from shingle roofs and the exceedingly high loss ratio upon this class, the insurance companies have recently increased the rates, and in case of the larger cities, where there is a congestion or conflagration hazard, an additional penalty for the absence of an approved anti-shingle ordinance, strictly enforced.

"Climatic conditions necessarily materially affect the wooden shingle roofs in this section, rendering them more inflammable, especially where the roofs are old and of inferior quality. In cases of isolated risks, I have observed a number of instances where a spark from the chimney or kitchen flue has fallen upon the wooden shingle roof, resulting in considerable damage and oftentimes total loss. Only recently in a Southern city a spark from a passing locomotive ignited the wooden shingle roof, and, fanned by a stiff breeze, very nearly destroyed two frame dwellings of considerable value before a motorized fire department could reach the scene. This occurred about noontime and can be substantiated. The old theory of defective flues has been, to a considerable extent, exploded where the wooden shingle roof is involved.

"Now, then, as to the best method of eliminating or reducing this hazard, this is quite a problem. In the South there is a large percentage of the dwelling class having this construction of roof, due partly to climatic conditions, as well as the fact that the cost is much less and in keeping with that of the frame building itself. I do not believe that this class of roof can be eliminated for years to come, but, in my opinion, the growing scarcity of timber, the reduced cost of hard material and particularly the increase in rate of insurance upon the wooden shingle roof will very materially reduce this class of construction."

ON and after January 1, 1918, it will be illegal to use the title "architect" unless a certificate of registration has been secured from the State Examining Board.

Avoiding Accidents Due to Falls in Building Work*

Every scaffold should be inspected by a competent man each time it is completed, but before it is used. This is essential even when it is to be used for only a few hours, for then it is perhaps most likely to be poorly constructed. The inspection should be especially thorough when an accident may endanger a large number of persons, whether workmen or otherwise.

Inspection should cover all parts of the scaffold, including handrails, foot-boards and screens, and should extend also to the part of the building above the scaffold and near the plane of the wall that is being erected.

In addition to the regular inspection, every foreman should examine the scaffold and satisfy himself of its safety before allowing his men to use it.

All scaffolds should be thoroughly inspected and repaired after every storm or high wind. Because the position of scaffolds is constantly changing, there should be an inspection every day. A more thorough inspection should be made once a week. The inspector should be required to make a written and signed report of every inspection, covering every important element of the scaffold.

Every man who works about the scaffold should be encouraged to report defects which he finds and suggest remedies for them.

Ladders

The side bars of ladders should be of straight-grained spruce and free from defects. The rungs should be of oak, hickory or ash and should be split and shaved to size and not turned.

A ladder used for the transport of materials should not be over 30′ or 35′ in height. It should project above the landing to which it extends at least 5′. If it is too short to permit this, stout strips should be nailed to the side bars.

One rung should be flush with the platform to which the ladder leads. If this is not practicable, the rung nearest the platform should be above and not below the platform.

Generally speaking, it is better to use single length ladders with intervening platforms than to use extension ladders in building construction.

Ladders up which material is carried should not be located over each other or over an unprotected area where men are at work or pass frequently. Wherever possible, material should be raised or lowered with ropes and not carried on ladders.

Men should go up or down ladders one at a time, so that they cannot drop material upon each other. Wherever possible, two-ladder ways should be constructed; one for the use of men going up ,and the other for the use of men going down.

Both the foot and the top of the ladder should be secured. The side bars should rest evenly upon a firm and level foundation. The ladder should be rigid and should not spring when in use. If it is not already sufficiently stiff, it should be stayed at the middle by a brace.

Ladders with missing or broken rungs or defective side bars should not be used until they are repaired. Defective side bars should not be spliced, but should be replaced. Ladders should not be used when the rungs are loose enough to roll.

Rungs or steps of ladders should always be notched-in or housed. All ladders should be made and repaired in a workmanlike manner and should not be hastily constructed of scraps, some of which are unsuitable for such use.

Temporary Floors

Not much need be said concerning the remedy for the hazards involved in leaving out the flooring from the steel framework of buildings. At least a temporary floor should be laid within two stories of the highest point at which iron workers are at work. With but little added labor and expense the lives of the workers could be muct better safeguarded by putting in a temporary floor within one story of the workers. In laying temporary floors, "traps" should be avoided.

Because of the peculiar hazards of their work, structural iron workers should be temperate, cool-headed, strong, active and healthy. They should not be permitted to work in exposed places during high winds nor at times when the beams are slippery from rain or frost. They should never be permitted to work in exposed places long enough to become unduly fatigued. Neither should they be permitted to engage in spectacular performances nor to expose themselves to unnecessary risks.

Hoistways

Like the absence of floors, the hazard of unguarded floor openings is apparent and the remedy is simple. The hazard exists because the openings are unguarded; the remedy is an effective guard around all floor openings. All hoistways and elevator shaft openings in each floor should be enclosed or fenced in on all sides by a barrier at least 8′ in height, except on two sides, where materials are taken off or put on the elevator or hoist. These two sides should be provided with an adjustable barrier not less than 2′ from the edge of whole suspended by ropes from hooks or some other form of support. The hooks used to support the scaffold and attach it to the building should be sufficiently large for the purpose and should be constructed of first-class material.

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* Suggestions offered by the Bureau of Statistics and Information of New York State.

Where manila rope is used it should be of long fiber, at least 1" in diameter, and double lashed at each point of suspension. All ropes should be protected by bagging or wooden blocking at the points where they come in contact with sharp edges. Rope knots should have the ends tied with smaller cord to prevent them from becoming untied. The free rope which accumulates when the scaffold is at a high level should be coiled upon the platform rather than allowed to hang down where it may be interfered with by curious or meddlesome persons or be fouled in some other manner.

The ladder which forms the base of the painters' scaffold platform has its side-bars parallel and slightly farther apart than usual. It may be strengthened by extending a small wire rope, about 5/16" in diameter, along the under surface of the side bars, from end to end.

All painters' scaffolds should be equipped with guard-rails and foot-boards similar to those already described.

Scaffolding Material

Great care should be exercised in the selection of material for scaffolds. Newness is not a sufficient test of strength. All wood should be straight grained and free from knots, injurious ring-shakes or other defects.

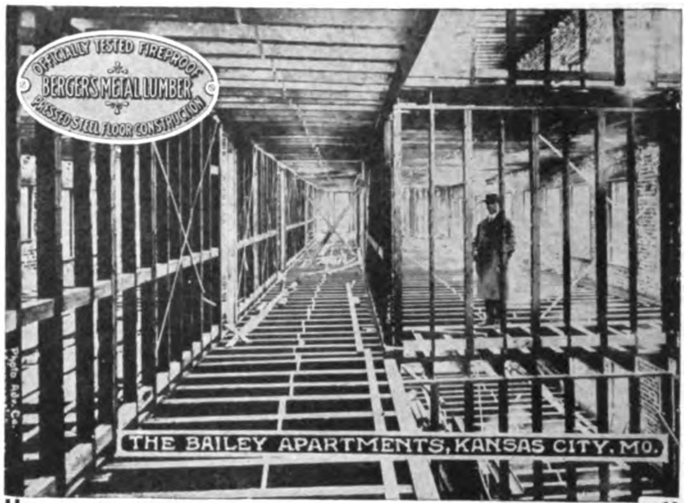
Green wood should be avoided in constructing scaffolds. Wet wood is even less resistant than green. All woods gain in strength and stiffness when thoroughly air seasoned or kiln dried. Air seasoned wood is about twice as strong and kiln dried wood three times as strong as green wood.

Not only is wet wood to be avoided, but also that which is alternately wet and dry often. The latter rots very quickly and planks so treated soon become unsafe. Lime also eats into wood and weakens it.

Spruce is probably the most suitable of the woods that are available for use in scaffolds, though long-leaf yellow pine is acceptable if it is of first-class quality. Hemlock is not good, as it is too brittle.

Selected cut nails or bolts are best for fastening the parts of scaffolds together. These should be of sufficient size for the particular purpose they are expected to serve. Wire nails are not suitable for use in scaffolds.

Ropes should be long fiber manila and frequently tested for strength. Acid weakens rope, but the effect is not noticeable immediately. This fact should be taken into account in making tests.


OFFICIALLY TESTED FIREPROOF
BERGER'S METAL LUMBER
PRESSED STEEL FLOOR CONSTRUCTION
THE BAILEY APARTMENTS, KANSAS CITY, MO.

Showing the first, second and third floor joists and partitions. Otis Goddard, Architect.

BERGER'S

Metal Lumber

(Patented)

THE isometric perspective view below shows the details of Berger's Metal Lumber standard construction for floors, supporting partitions and suspended ceilings. The illustration above shows a typical installation in which this construction was used.

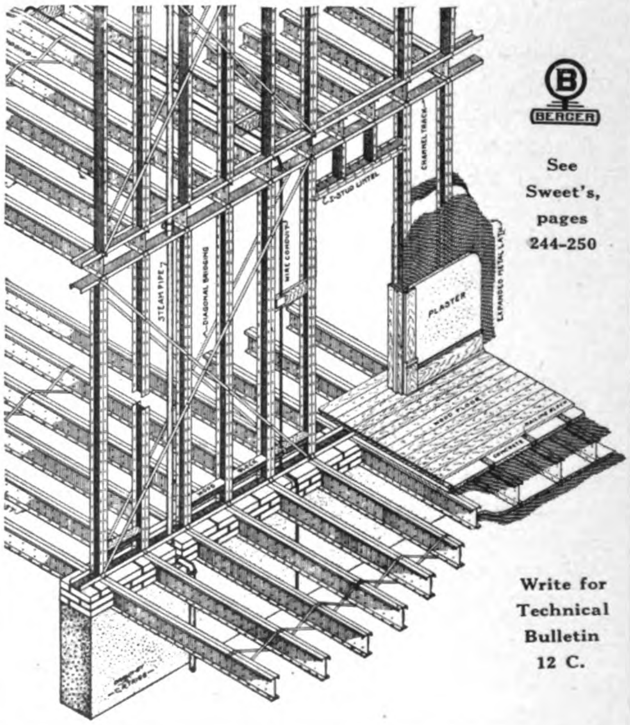
Note that joists are placed directly over supporting studs, and rivets used for connections throughout, assuring rigidity and strength of construction that cannot otherwise be obtained.

Note also the installation of plumbing pipes, conduits, etc. The bridging or bracing on partitions is important; this is applied before metal lath and serves to stiffen the partitions. Nailing blocks are inserted between studs for attaching wainscoating.

This fireproof and indestructible construction is used extensively in apartments, office buildings, hotels, institutions, etc. and gives exceptional strength and permanency at reasonable cost.

The Berger Mfg. Co., Canton, O.

Branches: Boston New York Philadelphia Chicago
St. Louis Minneapolis San Francisco Los Angeles
Export Dept.: Berger Bldg., New York City, U. S. A.



BERGER

See Sweet's, pages 244-250

Write for Technical Bulletin 12 C.

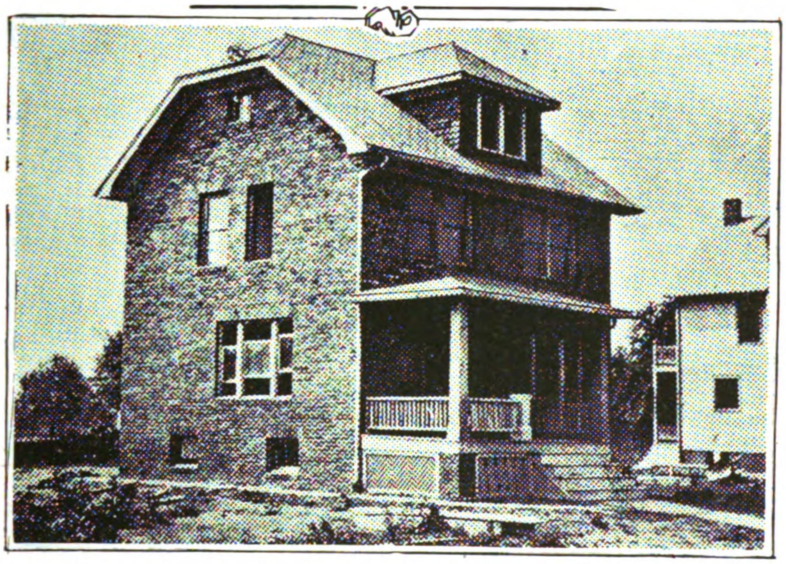
SAFE HOMES

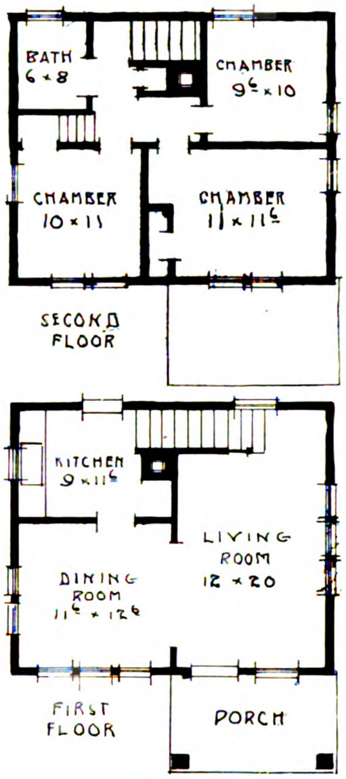
Edited by **RALPH P. STODDARD, Secretary**
Society Advocating Fire Elimination

An Average Man's Home

A "SAFE" home for the average man is the aim of W. T. Mallo, a prominent Cleveland contractor and speculative builder, who, during the past ten years, has provided hundreds of homes for Sixth City families.

Mr. Mallo heretofore has confined his home-building operations to wood. He was led to the use of safe materials by the demand which has sprung up in Cleveland for houses of permanent and safe type and the ready sale they have enjoyed.





Design and Floor Plans of Firesafe Home Built to Sell at Modest Figure

The house illustrated was his initial venture in the field of safe construction. It demonstrated to him that costs could easily be kept down to a point where the finished product could be sold on a basis to compete favorably with houses of wood. A "two-suiter" is nearing completion, which, he predicts, will show as advantageously as the singles.

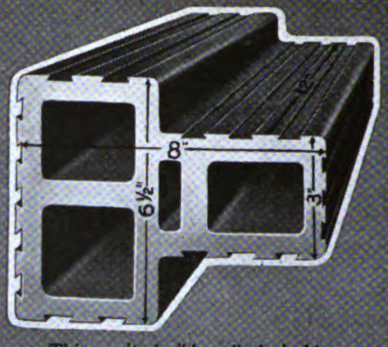
With the facts thus established, he is ready to hasten the construction of a block of fifty or more houses of both types. If possible, half the section will be completed before winter sets in. The holdings of Mr. Mallo comprise more than one hundred lots in the Washington Park district in the southern part of Cleveland, and if economic conditions next year warrant the entire block may be built up next summer.

Mr. Mallo has established the fact, as a result of his operations, that the average man's home is a house of six rooms, while five rooms fills the average demand for flat accommodations. He is therefore building his houses of these general types, although exteriors and plans may be varied in detail.

The hollow building tile bureau of the Society Advocating Fire Elimination takes the credit of converting Mr. Mallo to the use of safe materials. It placed in his hands estimated costs and other data, which convinced him of the desirability of employing permanent materials in his building operations. So far, his judgment has been more than justified and safe construction has gained another enthusiastic convert.

Famous Users

These famous business organizations, the most critical buyers in the world, have investigated and approved Denison Interlocking Tile for their own building walls. Isn't it worth your while to find out why?



This unit builds all desirable thicknesses of wall. See drawing below.

INTERLOCKING TILE

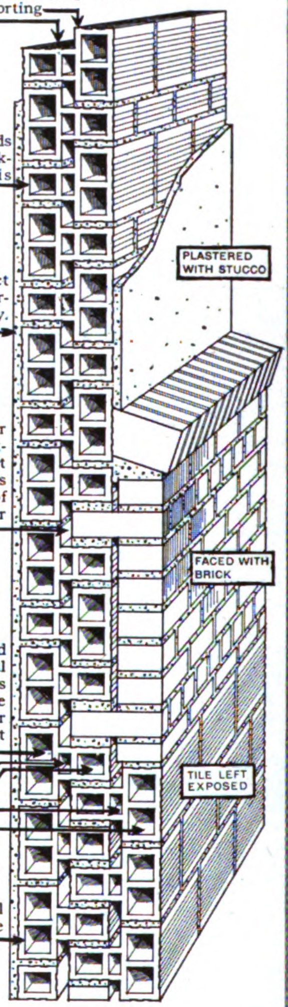
(TRADE MARK)

NORTHERN PACIFIC
HOTELS STATLER
BUFFALO DETROIT CLEVELAND
AMERICAN TELEPHONE & TELEGRAPH CO
ERIE
The Austin Co
Packard TWIN-6
Stone & Webster
W&L.E.
DU PONT
Studebaker
TEXACO
RED CROWN
STANDARD OIL COMPANY
ARMCO
Buick
Ford
Santa Fe
MKT
En-ar-co
Pathé
SOUTHERN PACIFIC LINES
FRISCO LINES
JAP-A-LAC
HOUSEHOLD FINISHES
THE CHICAGO MILWAUKEE AND ST. PAUL RAILWAY
W·C·K
WESTINGHOUSE CHURCH KERR & CO.
Manning-Bowman
Jiffy-Jell
Coca-Cola
UNITED FRUIT CO
The May Co
FLEISCHMANN'S YEAST
AirlinE HONEY
Carnation MILK
OTIS ELEVATOR
CALIFORNIA'S Sunkist
WINCHESTER
Skookum

THE CLAY PRODUCTS CO.

Lemcke Annex
Indianapolis, Ind.

175 W. Jackson Blvd.
Chicago, Ill.



Partitions always directly over each other — giving greatest possible supporting strength.

Same tile builds walls any thickness. This is 8-inch wall.

Plaster direct on tile—no furring necessary.

Every mortar joint interrupted by air pocket which prevents conduction of heat, cold or moisture.

Honeycombed with individual air spaces which make best insulator against heat and cold.

12-inch wall built of the same tile.

"Carnation Milk"
Plant, Stanwood, Wash.
W. N. MacBriar, Engineer
One of their seven
Interlocking Tile Factories

Licensed under the patents of the Denison Interlocking Tile Corporation, 518 Guardian Bldg., Cleveland, Ohio

Custom Homes—Ready-Made

A NOVEL scheme is being worked out in Cleveland by a group of fire safety enthusiasts operating through the Fire-Safe Development Company.

Their plan, briefly, is the erection of expensive houses made from special or custom designs and sold complete with the land, after the order of the ready-made houses. To this they have added the further innovation of making them consistently firesafe.

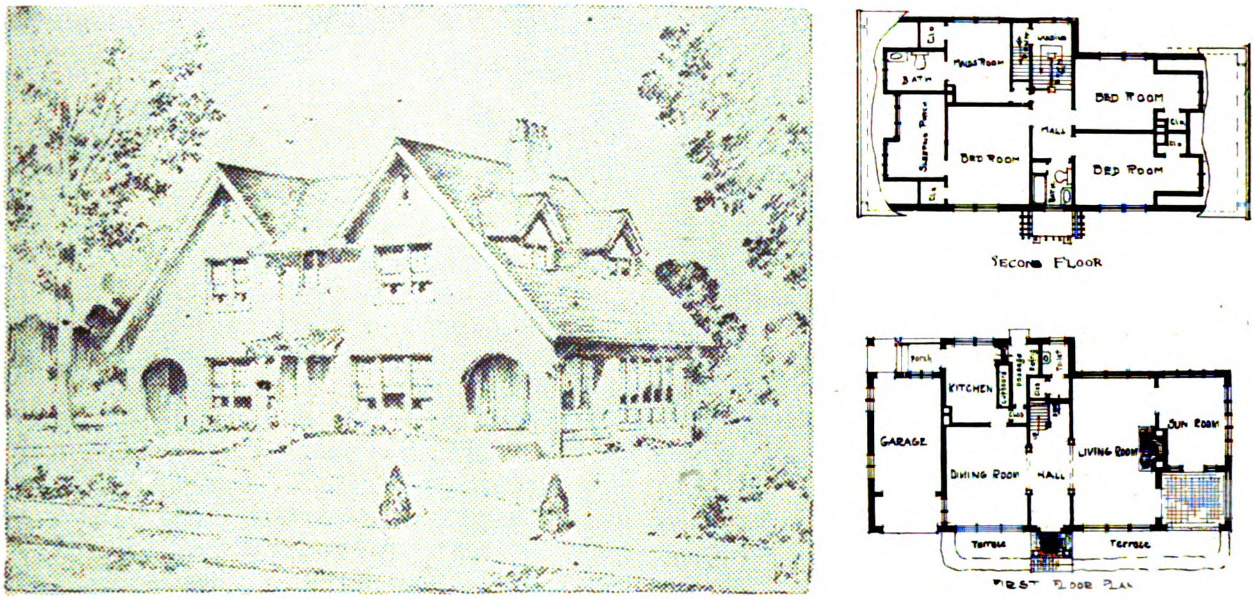
This company has taken an entire section in Westhaven, one of Cleveland's most exclusive suburban tracts, and is erecting houses selling from $15,000 to $25,000. It comprises Cleveland's first firesafe community.

The house shown in the accompanying cut is the fourth to be erected on this tract. Like the others, it conforms to a general scheme of design, which will make the entire development harmonious.

It is a large house with garage attached, the fireproofing features being such that no risk is thus incurred. Both sun porch and open loggia are provided, making this part of the house available the year round. The downstairs lavatory is another good feature. Four large bedrooms, one of which with a bath is for the maid, are provided in the second story.

All twenty-three houses in this firesafe community are to be constructed of hollow building tile, faced with cream-white stucco. The roofs will be of burned clay tile of varied colors, to harmonize with their neighbors.

With the building of each added house of the firesafe character added impetus is given to this type of construction, and the community as well as the individual property owner gains thereby.



Home of Substantial Construction Built of Firesafe Material Throughout

Build a Home—But Build It Properly

THE "Build-a-Home" movement, initiated by the real estate men of a city in Central New York, and since enthusiastically taken up at various important centers throughout the country, has the active support of the lumbermen who endeavor to convince the prospective builder that lumber is the only material of which the new home should be erected.

Through aggressive and skillfully directed publicity the lumbermen have succeeded in convincing a considerable number of prospects to their views, and have greatly profited thereby.

Those of the home-seekers, however, who have had the forethought to study building conditions themselves instead of accepting without question speciously prepared arguments and conclusions offered by selfishly interested parties, speedily learned of the many and substantial advantages possessed by homes of masonry construction over those built of lumber, and have acted in accord with such opinion. The result has been not only added comfort, safety and general satisfaction on the part of each individual home builder, but increased community safety as well, for the fire menace of a city or town is reduced just in proportion to the number of properly built structures erected therein. A further gain to the community through the erection of firesafe homes is the creation of permanent taxable values and the insurance of a more stable and hence more valuable population.

The "Build-a-Home" movement is all right and should be encouraged, provided the home is to be of the right type and not merely one that will provide admirable fuel for flames.

JOHNS-MANVILLE
ASBESTOS ROOFING

Foster Building,
New York City
F. E. Townsend,
Architect

NO more convincing testimonial for the life of Johns-Manville Asbestos Roofing exists than mother earth's own history. For ages asbestos has repelled the fiercest heats, the shock of quick cooling, and earth's corrosive agents. Unscathed after all these tests, it comes to you felted into sheets, ready to apply to your buildings — a natural roofing material whose inherent properties answer every requirement that you would include in specifying an ideal roofing.

No other roofing material has such a past behind it—no other roofing has such a future before it on your building.

For flat roofs, Johns-Manville Asbestos Built-Up Roofing. For sloping roofs, Johns-Manville Flextone Asbestos Roofing. For skeleton framing, Johns-Manville Corrugated Asbestos Roofing. For homes, Johns-Manville Transite Asbestos Shingles. All these roofings are backed by

Johns-Manville Roofing Responsibility

—a principle that certifies the service of every Johns-Manville Asbestos Roofing. You can register your roofing with us, and thus be assured of complete satisfaction in the service it gives.

H. W. JOHNS-MANVILLE CO.
NEW YORK CITY
10 Factories—Branches in 55 Large Cities

WEATHER:
Always warm in winter and cool in summer if you are in a firesafe home, office or factory building.

The Fireproofing News

CONTAINING DETAILED DESCRIPTIONS OF NEW DEVICES AND APPLICATIONS OF MATERIALS WHICH ARE OF REAL VALUE IN FIRESAFE BUILDING: ALSO NOTES ON THE LATEST BOOKLETS, CATALOGS AND OTHER FIRESAFE LITERATURE, WITH OTHER ITEMS OF INTEREST TO THE FIREPROOFING FRATERNITY

LATEST EDITION

Copyright by Constrvction Publishing Co., of New York, N. Y., 1916

New York City, N. Y., August, 1917

Priceless

FOR THE PROMPT DETECTION OF FIRE

Edward F. Croker, former chief of the New York City Fire Department, once remarked that in fire fighting time was measured by seconds, not minutes; and that every moment gained in the detection of a blaze meant a distinct reduction in the loss.

The truth of this statement is so generally recognized by owners of important industrial plants that but few such properties are unequipped with a fire detector system; operated either independently or in conjunction with automatic sprinklers.

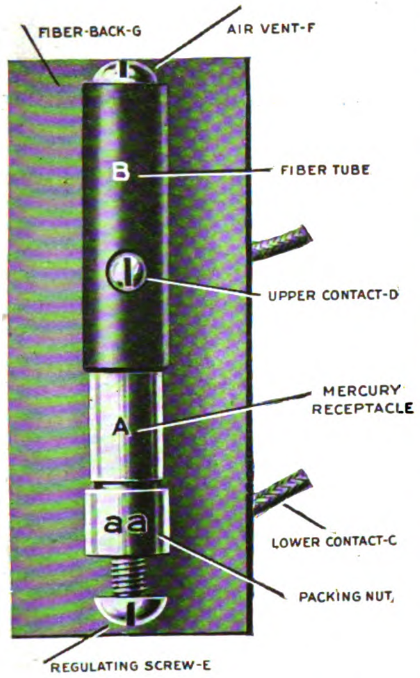


Fig. 1.—The Monitor Detector

An alarm system that has proven its merit under the most severe tests, and that is rapidly gaining in favor with business men, is that known as the "Monitor," manufactured by the New York Brass Foundry Company of New York City.

Designed for the announcement of fire automatic control and closing of factory fire doors and shutters, annunciation of rising temperatures in refrigeration plants, control of automatic sprinklers, autometer control and dropping of asbestos fire curtains and the opening of all exit doors, and various other uses, the "Monitor" efficiently performs its assigned task and proves itself a sleepless watchman.

The Monitor Detector, as shown in Fig. 1, is a thermometer consisting of steel tube "A" as a mercury receptacle, to which is attached the lower contact screw "C," also a regulating screw "E," by which the detector is set to any given degree from the freezing point of mercury up to as high a temperature as conditions require, and a fibre tube with upper contact screw "D."

Under ordinary conditions each Monitor protects 200 square feet, figuring floor area. It is set either suspended from the ceiling, centrally located, or attached to the side walls as near to the ceiling as possible, preferably under the picture moulding, if not too low down. In a room, say 12 by 15 feet, one detector suspended from the ceiling at center would be sufficient, but set on the side walls, two would be required; this, however, should be left to the electrician doing the work of installation.

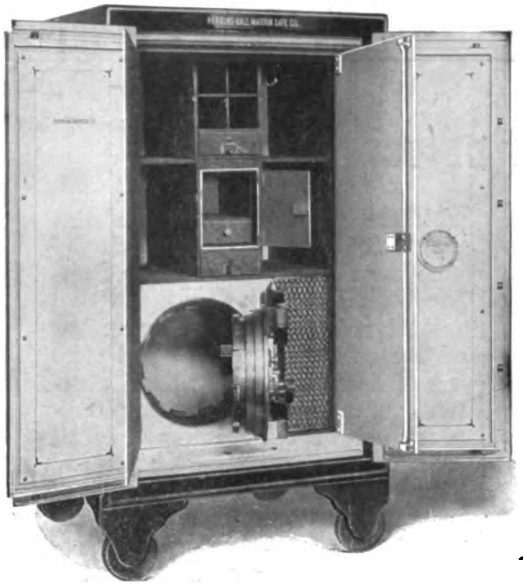
The wiring is run from the detectors to an annunciator conveniently located, and each station indicated thereon irrespective of the number of detectors covering said station; in an apartment house, for instance, each apartment would constitute a station, and all the detectors installed in the several rooms and closets would be connected up to one circuit to the annunciator, and the alarm would be rung in as of that station, whether the fire be in the kitchen, parlor or closet. It would not be practical, however, in a large hotel with fifty rooms to a floor to make each and every room a station; in such instances the floors would be divided into stations, and at each station a colored light shown simultaneously with the alarm on the annunciator in the chief engineer's office.

Single Unit

Properly placed in theatres, schools, halls or other places of public assembly, the Monitor would give timely warning of an incipient blaze; automatically release all exit doors, thus permitting the prompt and orderly escape of all persons in the threatened building,

HERRING-HALL-MARVIN SAFE COMPANY

Designers and Manufacturers of



Fireproof and Burglarproof

SAFES, VAULTS & SAFE DEPOSIT BOXES

For Offices, Residences, Banks and Bankers

We offer the benefit of our experience of over seventy-five years in the manufacture of fire and theft-resisting safes and vaults and specially constructed Burglarproof equipments for Banks and Safe Deposit Companies.

Plans and Specifications furnished without cost

Executive Offices	**Factories**
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Branches

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Birmingham, Ala. New York, N. Y.

and, at the same time, notify the fire fighters of the danger point.

Not the least valuable use to which the equipment can be put is its installation upon steamships, both passenger carriers and freighters. Fig. III shows its application in such connection. Installed in a cabin the occupant has a sense of security he would not otherwise possess, while its placement in the hold assures the officers of the vessel of instant notice of fire, and permits of early and effective combative measures.

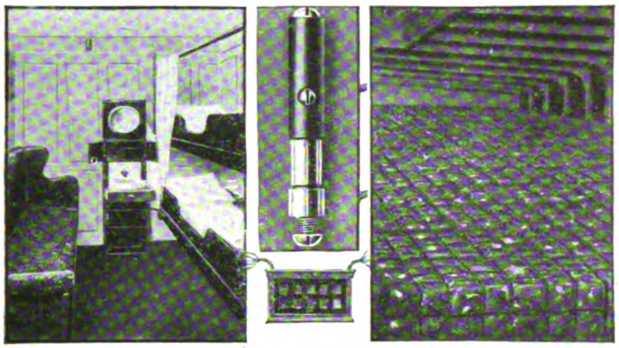


Fig. 3—Monitor Detector as Used on Vessels

Of distinct service in the safeguarding of industrial plants in the operation of the "Monitor" system, is that upon the first alarm of fire anywhere in the room, all fire doors and shutters throughout the property are automatically and simultaneously closed, thereby confining the fire to the point of its origin and giving the employees ample opportunity to protect both themselves and the material or equipment in their charge.

The floors in the average industrial plants are divided by firesafe walls into limited areas, communication between which is had through firedoors. These are almost invariably kept open and their value is contingent in good part upon the rapidity and security with which they close in the event of fire. Attached to each, of course, are links, timed to fuse at given temperatures. The "Monitor," however, releases all doors within the building wherever the fire may be, thereby dividing the property into numerous separate structures, as it were, each cut off absolutely from the other and barring the progress of the flames from every avenue. The value of such isolation is easily appreciated.

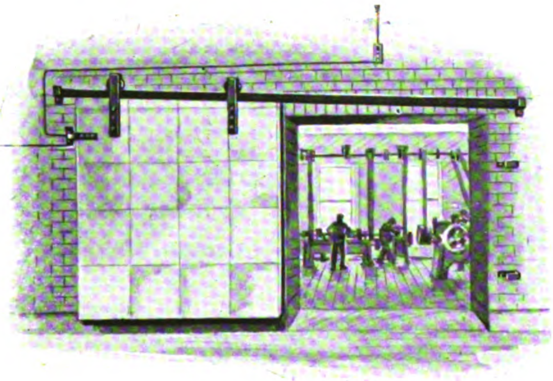


Fig. 4—Through the operation of the alarm all fire doors close automatically

Serviceable in the large industrial or office buildings, the Monitor detector is likewise valuable in the home, the barn, garage, or, in short, in any structure where human beings congregate or valuable property is stored.

PROTECTING VALUABLE RECORDS

In these strenuous days the Federal Government is constantly in receipt of, or its employees are preparing, documents of the greatest importance, the loss of which would be a serious blow not alone to the United States, but to its Allies as well. It is a significant fact that the officials in the numerous departments of the National Service, charged with the care of valuable records, have purchased a number of Safe-Cabinets, the contents of which, they appreciate, will be secure alike from destructive fire and from pilfering fingers.

That the example of the Federal Government in this important respect is followed by leading business firms and institutions throughout the country is sufficiently attested by the large number of such who have equipped their respective offices with the product of the Safe-Cabinet Company.

◆

To develop the business of the old Ransome Concrete Machinery Company a new corporation of like name has been formed at Dunellen, N. J., with a capital of $1,000,000. The plans of the new enterprise embrace the inclusion of the entire line of building contractors' equipment.

◆

The Concrete Steel Fireproofing Company is a new organization at Detroit, Mich., the chief factors in which are S. V. Taylor and M. J. Quinn. It will handle in its territory the product of the Concrete Steel Company of New York and the General Fireproofing Company of Youngstown, Ohio.

◆

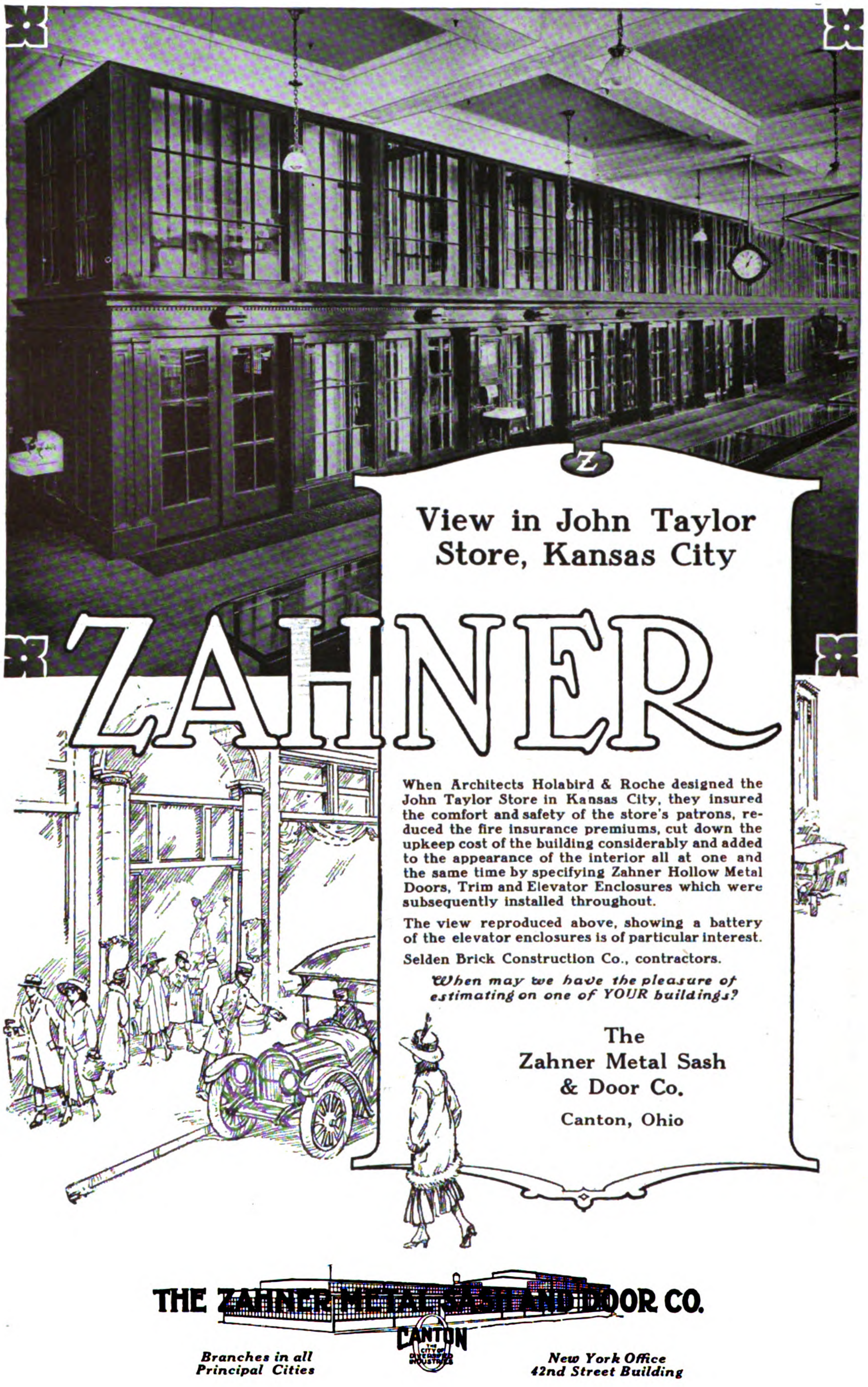
Architects must now be licensed in Idaho, a law to that effect having recently become operative.

◆

L. D. Albin, formerly assistant general sales manager of the Ingersoll-Rand Company of New York City, has been appointed general sale manager.

◆

The Barker-Greene Company of Aurora, Ill., is marketing a new and highly promising type of bucket loader.



View in John Taylor Store, Kansas City

ZAHNER

When Architects Holabird & Roche designed the John Taylor Store in Kansas City, they insured the comfort and safety of the store's patrons, reduced the fire insurance premiums, cut down the upkeep cost of the building considerably and added to the appearance of the interior all at one and the same time by specifying Zahner Hollow Metal Doors, Trim and Elevator Enclosures which were subsequently installed throughout.

The view reproduced above, showing a battery of the elevator enclosures is of particular interest.

Selden Brick Construction Co., contractors.

When may we have the pleasure of estimating on one of YOUR buildings?

The
Zahner Metal Sash
& Door Co.
Canton, Ohio

THE ZAHNER METAL SASH AND DOOR CO.

CANTON

Branches in all Principal Cities

New York Office 42nd Street Building

SOLID WIRE GLASS

Most devices or inventions are brought out to fill some pronounced need. Wire glass, on the contrary, was first made as a laboratory experiment, was used for a long time in a desultory fashion for reducing the hazards of broken glass, and not until years after its invention was it discovered—quite by accident—that it is a fire retardant of the first order. It is now recognized as such and finds nearly as universal specification as brick or concrete.

Solid wire glass, as made by the Pennsylvania Wire Glass Company, is rolled to the full thickness and the wire is centered all in one continuous operation. The result is a homogeneous product of great strength. This property has led to its selection for use in the most important railroad and industrial buildings in recent years.

Solid wire glass is made in the ordinary rough, ribbed and polished, as well as in several special surfaces; the latter is designed to fill unusual needs.

For even and brilliant light diffusion the company makes its "Cobweb" pattern, which both experience and experiment have shown unequaled for the purpose.

One of the principal difficulties in the way of satisfactory skylight service is the dripping of condensation from the under side of the glass. In some instances a moderate amount of drip does not matter greatly, but in others a single drop on the goods being made or stored below spells serious damage, if not absolute ruin. "Aqueduct" wire glass does away with this hazard.

"Aqueduct" wire glass has a corrugated surface, the channels being of such size and form as to take the greatest advantage of what is known as "capillary attraction." If it is set at an angle of 10 degrees or more, and kept anywhere nearly clean, "Aqueduct" positively will not drip.

"Aqueduct" wire glass has many novel features:

Full one-quarter-inch body, with many supporting webs.

It is a most brilliant light-diffuser.

Is scientifically designed and gives the greatest capillary attraction.

It has hard, smooth weather surface and cuts freely.

It is guaranteed as follows:

Any crackage or breakage which may take place in transportation, in installation, or at any time within one year after installation, from any cause whatever, will be made good by the manufacturer by a shipment of glass, f.o.b., factory, to replace the breakage.

In conjunction with the continuous form of steel sash, now so popular, wire glass finds widespread use in the highest types of fireproof mills, factories, storage warehouses, railway and mercantile buildings.

The Pennsylvania Wire Glass Company maintains an engineering department in its New York office, at 20 West Thirty-fourth street, New York City. To this office may be referred, with advantage, questions pertaining to the economical employment of wire glass.

◆

CEMENT TO BE PURCHASED BY STATE

Under the provisions of a recent act all cement used in the construction of public buildings in Wisconsin, or upon highways built in part with state money, will be purchased by a State Commission appointed for the purpose.

The state cement purchasing commission shall make the proper and necessary arrangements for the testing of all cement delivered in the state under the agreement with the contracting company. The cost per barrel of this testing shall be a proper charge against the consumer and shall be added to the contract price of the cement, shall be collected by the company furnishing the cement and shall be paid over by said company to the testing agency or agencies selected by the state cement purchasing commission to do the testing. Every bag of cement purchased under this section shall have attached to it a tag bearing the words "State Tested Cement," in addition to the special sampling tags of the testing agency.

◆

The business of the Kent Machine Company, of Kent, Ohio, has been taken over by the Falls River Company. The company manufactures concrete mixers.

"FIRE-RETARDANT WINDOWS"

Captioned as above, the S. H. Pomeroy Company, Inc., of New York City, has issued in attractive booklet form an address delivered by Mr. Pomeroy before the New York Chapter of the National Fire Prevention Association in June last.

In speaking of fire-retardant windows, Mr. Pomeroy is dealing with a topic upon which he is exceptionally well posted, for with his former partner, Mr. Voightmann, he "produced the first hollow-metal fire-retardant window offered as a commercial article for the consideration of insurance authorities." That was in 1897, and the specifications for that window, adopted generally by underwriters, have not been changed in any material respect since that time.

"I do not mean," said Mr. Pomeroy, "that there have not been vast improvements made since that first window appeared. I do mean that that original hollow-metal window embodied most, if not all, of what are still recognized as the essential features of a safe window."

Windows constitute a very important feature of the modern commercial structure, and architects and engineers charged with their planning should secure a copy of the Pomeroy booklet and attentively follow the statements made therein.

◆

INLAID SLATE ROOFINGS

The Inlaid Slate Company, of Pen Argyle, Pa., is circulating an attractively prefaced booklet describing its product and giving illustrations of numerous buildings upon which it is used. While possessing all the qualities of slate as to durability, fire safety and wearing strength, the Inlaid Slate, through a process controlled by its owners, can be laid economically and securely.

◆

A branch office has been opened at 161 Devonshire street, Boston, Mass., by the Vulcanite Portland Cement Company.

◆

A recent incorporation is the Indiana Portland Cement Company, of Huntington, Ind. Its capital is placed at an even million dollars.

for

Converts to Cooperation

Analyze this and the past numbers of Constrvction

Then ask yourself if you ever heard of anyone doing such real service for the fireproofing cause. It is our conception of vital boosting—this jumping right into legislative battles and fighting for ordinances favoring the use of fireproof material in building construction.

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GOVERNMENT TESTING HOLLOW TILE

By request of a number of manufacturers the Bureau of Standards of the Federal Government is conducting a series of tests to determine the strength of hollow tile. A series of walls 5 feet long and 12 feet high have been erected, with thicknesses of 6.8 and 12 inches. Those already laid up have been set with the tile on end. It is proposed to construct walls of similar size with the tiles placed on their sides. Other variables will enter into the work, and when the investigation is completed about 50 will have been built. Some of these will be tested by direct compression; others by applying a load across the middle of the side, with the purpose of determining somewhat the ability of these walls to withstand wind pressure.

◆

MODEL HOMES FOR FILIPINOS

With a view to improving the housing conditions of the poor, the Philippine Health Service has constructed a number of model houses of new fireproof material consisting of cement, sand and ipa, or rice husks. These can be built for a little more than the present unsanitary dwellings and, it is estimated, will last more than twice as long.—Popular Mechanics.

◆

INDIVIDUAL LIGHTING SYSTEM

Details regarding the method, cost and results of establishing the "Delco-Light" system of individual electric lighting plant are given in a description booklet issued by the manufacturers, the Domestic Engineering Company of Dayton, Ohio.

◆

The Smith Brick and Tile Company has been formed at Mason City, Iowa, with a capital of $500,000.

◆

Russell Bone is president and W. P. Stevens, Jr., vice-president and secretary of the lately formed Dixie Fireproofing Company of Macon, Ga.

CONCRETE BLOCKS FOR SILO BUILDING

How reinforced circular blocks for silo building can be made is described in a pamphlet issued by the Kenny-Hoflund Company, of Harwarden, Ia. Through a groove in the block a high carbon steel rod is placed encircling the entire silo, the ends overlapping the key block over which they are placed. The cored out ends form an opening two inches in diameter where the blocks are laid together, the openings being filled in with cement mortar. When fully placed the exterior of the blocks is given a coat of pure cement, while the interior is given a coat of plaster made of rich concrete.

Two blocks are made by the machine at a time, the daily capacity of a machine being sufficient to build an average-size silo.

◆

With a capital of $200,000 the Such Clay Company of Perth Amboy, N. J., has been organized to mine clay and sand.

BRICK AND TILE PRODUCTS SHOW LARGE INCREASE

Large increases in the value of brick and tile made in the United States in 1916 are reported to the United States Geological Survey, Department of the Interior. The total output amounted to $159,042,849—an increase of $33,248,005, or more than 26 per cent over the figures for 1915. The value of every variety of product classified by the Geological Survey except two was increased. Common brick, the product of greatest value, the output of which has been declining in recent years, showed a large increase in both quantity and value. There were 7,394,202,000 brick reported for 1916, valued at $49,357,411, or $6.68 per thousand—an increase in quantity of $543,103,000 brick and in value of $7,212,119, or 17 per cent. Fire brick, valued at $30,806,129, increased $11,966,198, or 64 per cent. Sewer pipe, which showed a large decrease in 1915, rallied in 1916, and showed a large increase. Its value in 1916 was $13,577,006—an increase of $2,317,657, or 21 per cent. Vitrified brick or block remained practically stationary, being valued at $12,236,890—an increase of only $5,991 over 1915. The front brick industry showed a considerable gain, its output being valued at $11,464,614—an increase of $1,929,078, or 20 per cent. Draintile and architectural terra cotta also showed large increase over 1915. Tile (not drain) valued at $6,475,464—consisting of roofing tile ($914,240), floor tile ($1,438,231), ceramic mosaic tile ($1,308,861), faïence tile ($814,077), and wall tile ($2,000,055)—showed a gain of $1,289,409, or 25 per cent.

Brick and tile products are classified naturally into three divisions, (1) structural materials, (2) engineering and refractory products, and (3) miscellaneous wares. The first, structural materials, including building brick of all kinds, terra cotta, fireproofing, and tile (not drain) was valued at $84,643,252 in 1916—an increase of $14,234,136, or 20 per cent, over 1915; the second, engineering and refractory products consisting of vitrified draintile (used principally for paving), sewer pipe, stove lining and fire brick, were valued at $67,305,448—an increase of $15,636,664, or 30 per cent, over 1915; the third, miscellaneous wares, consisting of such products as adobes, assay supplies, burnt clay ballast, chemical brick and tile chimney pipes, tops, conduits, glass house pots and supplies, retorts, sewer block, and wall coping, were valued at $7,094,149—an increase of $3,377,205, or 91 per cent, over 1915.

Pennsylvania was the leading state in the production of brick and tile, reporting these wares to the value of $29,630,653, or 19 per cent of the total—an increase of $8,732,281 over 1915. Pennsylvania's principal brick and tile product in 1916 was fire brick, valued at $15,200,354, which was nearly 50 per cent of the total value of fire brick for the entire country. This was an increase of $6,111,404 over 1915. Ohio ranked second, with products valued at $25,506,344, or 16 per cent of the total—an increase of $4,596,502. Ohio's principal brick and tile product in 1916 was sewer pipe, valued at $5,132,810—an increase of $1,413,020 over 1915. Illinois was third, with products valued at $16,507,845—an increase of $2,664,799 over 1915. Illinois' principal brick and tile product in 1916 was common brick, of which it was the leading producer, its output being valued at $6,738,152—a decrease of $132,838 from 1915. New Jersey was fourth and New York fifth, with products valued at $9,749,524, and $8,410,340, respectively, both States showing large increase in value compared with 1915.

◆

WINTER PLANS FOR SUMMER BUILDING

When the wind whistles around the chimney and the glowing fireplace invites us to spend our evenings at home, many of us are beginning to plan for improvements, additions and new buildings to start in the early spring.

More and more there is a tendency to build better. The great losses by fire that constantly occur in this country are coming to be regarded as almost criminal. The great majority of waste through destruction by fire is absolutely unnecessary if proper precautions are taken to prevent the spread of flames.

The home builders in the past have seemed to regard the matter of protection from fire as applying only to business buildings or large structures. As a matter of fact, it is just exactly as important that homes be properly constructed if we are going to prevent such conflagrations as we have witnessed in a great number of our important cities.

The use of inflammable roofing should not be permitted. Fire-resisting metal shingles that will not ignite or offer food for flames are economical, durable and attractive in appearance.

It is now possible to have the framework of the houses of metal lumber, which takes the place of wood studs and joists piece for piece. It is easily erected and gives a substantial fire-resisting construction, adding greatly to the value of the building to the owner and to the community. This metal lumber construction has been used in practically every state of the Union and in many foreign countries, and has proven a very practical construction.

Expanded metal lath for years has been used in the larger buildings and is now being used in a large number of the better-built homes. This lath not only offers no food for flames, but it reinforces the plaster in such a way that cracks are prevented, thus making it possible to decorate immediately after the plaster is dry. It also prevents rats and mice from gnawing through the walls, thus giving sanitary protection as well as fire protection.

Even where the ordinary wood studs and joists are used for the framework of the home, the application of expanded metal lath will greatly reduce the fire risk, as plaster on metal lath will resist intense heat, as has been proven by official tests made where plaster on metal lath applied on wood studs resisted a fire of 1,700 degrees for a period of over an hour without any sign of giving away. This means that a fire starting in any room can be held in that room sufficiently long to get it under control before it spreads to other parts of the building.

We shall be glad to place those of our readers who are interested in fire-resisting materials for their new buildings in touch with concerns who will give them full information.

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He: "Not much. That's *your* insurance, not mine. I figure we can trim about all the other items so as to save at least $400 a year, and I'm going to take a hundred of that and buy another Postal policy while I can get it. You and the kiddies may be glad some day."
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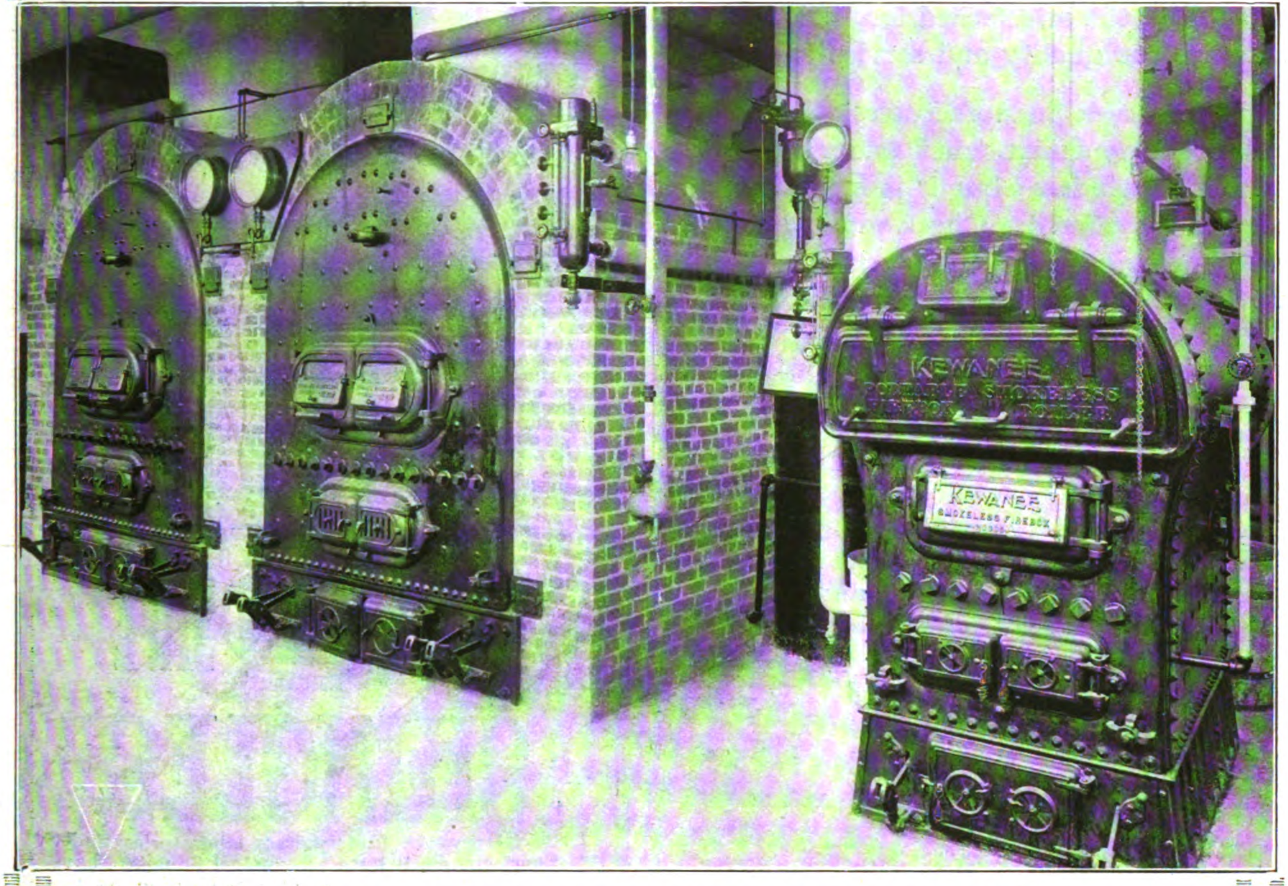

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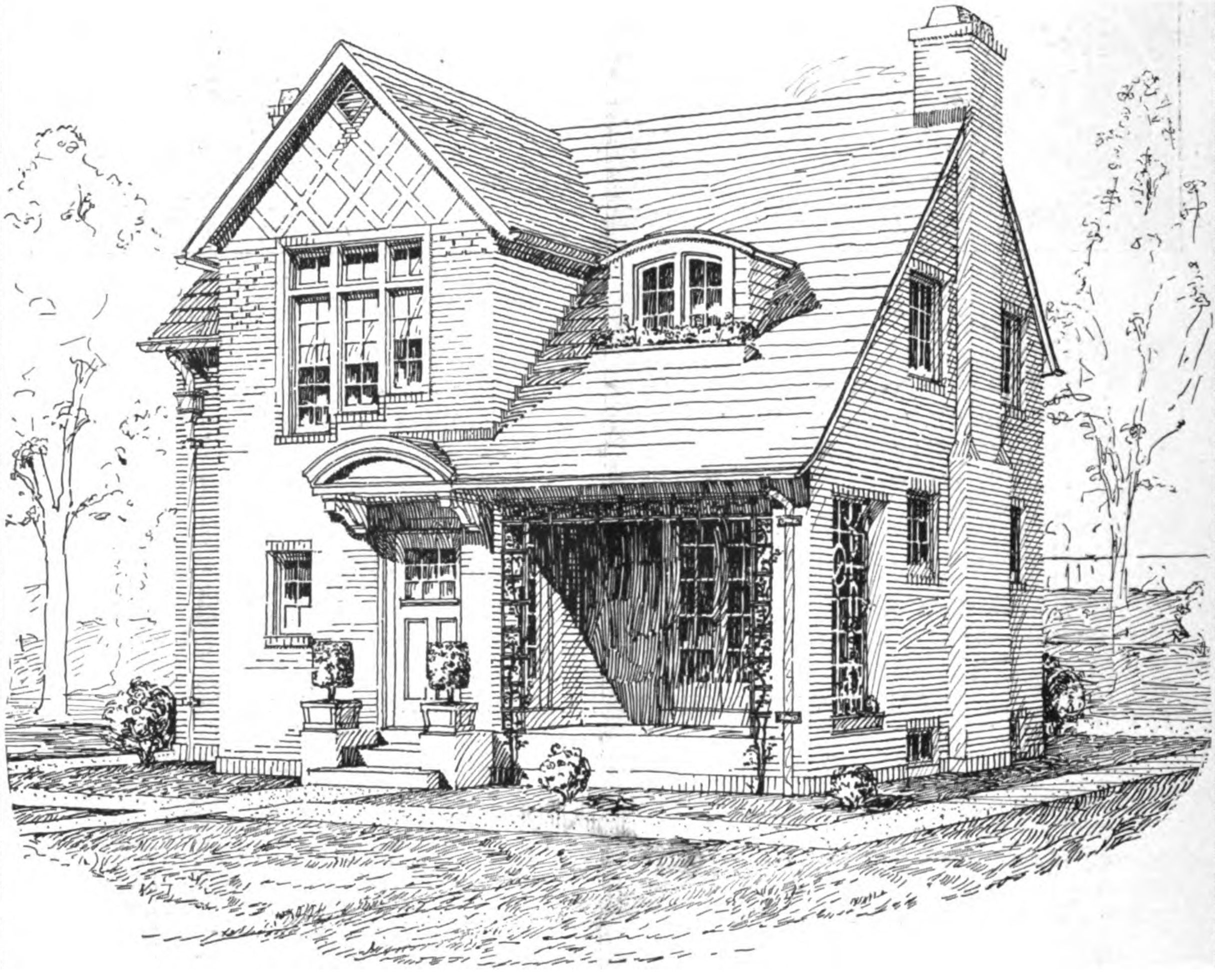

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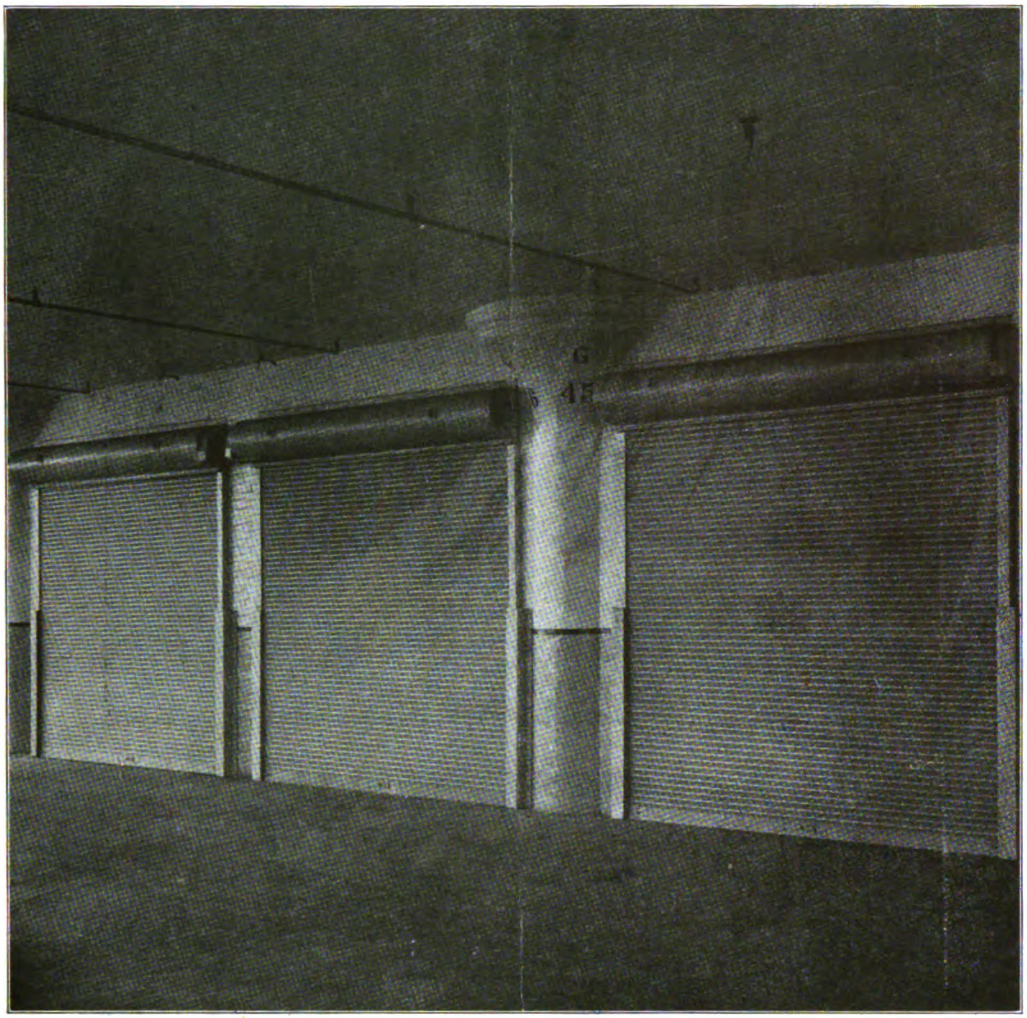

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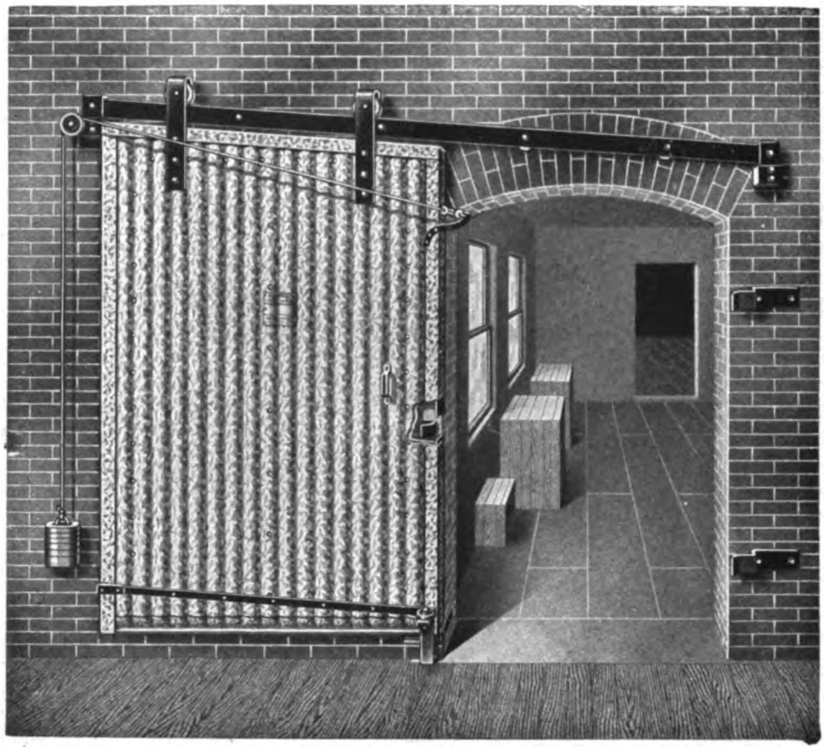

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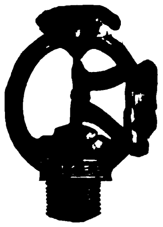

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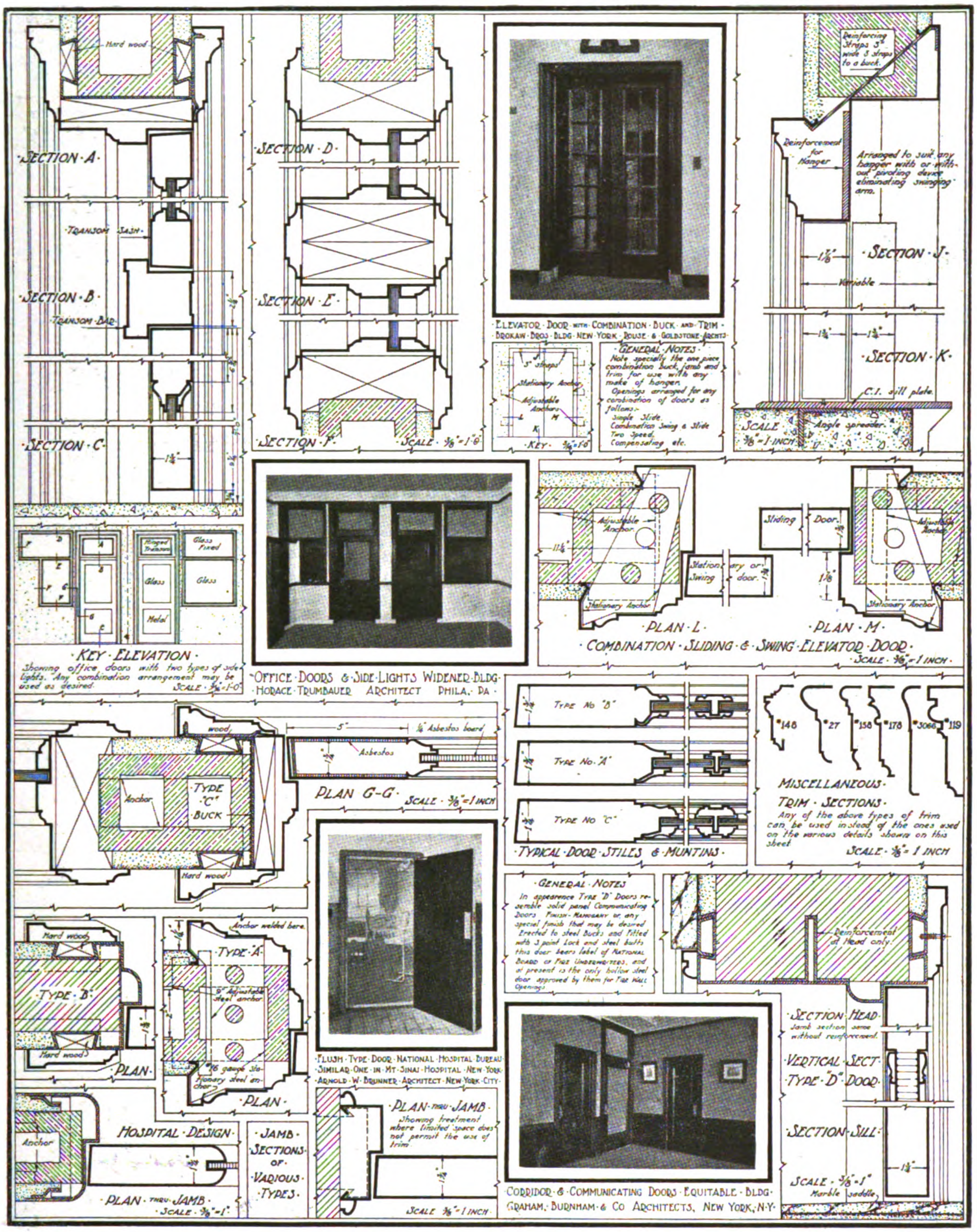
FIRE SAFE DOOR WAYS

STEEL DOORS, BUCKS and TRIM



·ELEVATOR·DOOR·WITH·COMBINATION·BUCK·AND·TRIM·
·BROKAW·BROS·BLDG·NEW·YORK·ROUSE·&·GOLDSTONE·ARCHTS·

·GENERAL·NOTES·
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Single Slide.
Combination Swing & Slide
Two Speed.
Compensating etc.

·KEY·ELEVATION·
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SCALE·⁵⁄₁₆"=1-0"

·OFFICE·DOORS·&·SIDE·LIGHTS WIDENER·BLDG·
·HORACE·TRUMBAUER ARCHITECT PHILA.·PA·

MISCELLANEOUS·
TRIM·SECTIONS·
Any of the above types of trim can be used instead of the ones used on the various details shown on this sheet
SCALE·⅜"=1 INCH

·GENERAL·NOTES
In appearance Type "D" Doors resemble solid panel Communicating Doors. Finish—Mahogany or any special finish that may be desired. Erected to steel Bucks and Fitted with 3 point Lock and steel butts this door bears label of NATIONAL BOARD OF FIRE UNDERWRITERS, and at present is the only hollow steel door approved by them for Fire Wall Openings

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·SIMILAR·ONE·IN·MT·SINAI·HOSPITAL·NEW·YORK·
·ARNOLD·W·BRUNNER·ARCHITECT·NEW·YORK·CITY·

·PLAN·THRU·JAMB·
Showing treatment where limited space does not permit the use of trim

Section Head: Jamb section same without reinforcement.

·CORRIDOR·&·COMMUNICATING·DOORS·EQUITABLE·BLDG·
GRAHAM, BURNHAM·&·CO ARCHITECTS, NEW YORK, N·Y·

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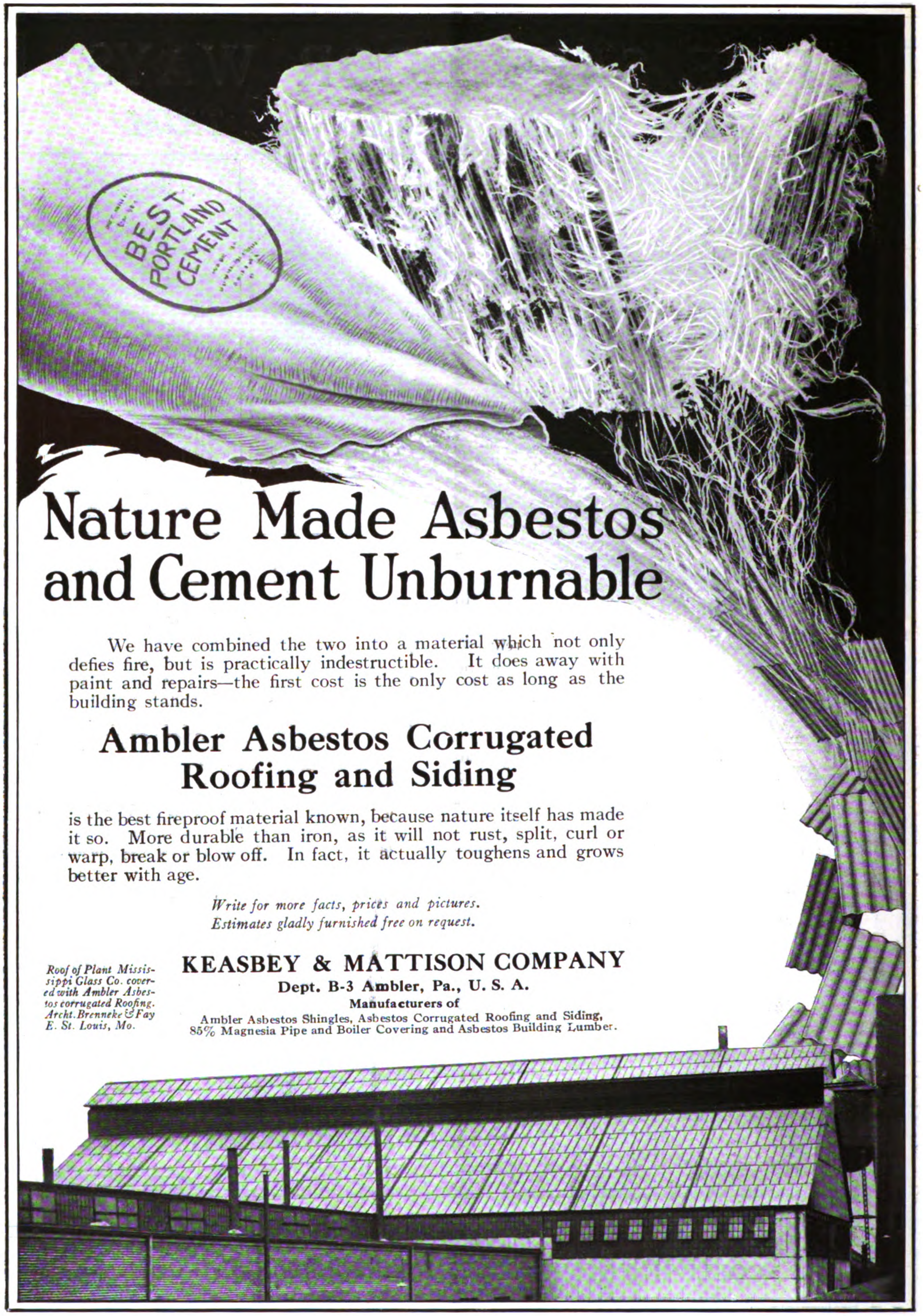

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CONSTRVCTION
ADVOCATING THE CONSISTENT VSE OF
FIREPROOFING MATERIALS & PROTECTIVE DEVICES

VOL. V SEPTEMBER, 1917 No. 3

A Rich Field for Development

NEW building operations, both in number and in value, are far below the normal throughout the country, due mainly to the demands of the Federal Government for enormous quantities of steel and other basic-building materials and the unwillingness of large financial institutions to loan appreciable amounts until general business conditions stabilize.

How this enforced idleness may best be overcome is the problem with which architects, engineers, material manufacturers and building supply men, not to mention real estate dealers, are now wrestling.

The answer is largely to be found in the rehabilitation of structures—mercantile, industrial, office and residential—that for one reason or another have outlived their former usefulness and become unprofitable. Wide-awake real estate men discovered that a great deal of property, that for one reason or another had fallen into decay and become a burden to the owner and an eyesore to the community, could through the expenditure of comparatively small sums be transformed into up-to-date, attractive and easily-rented structures, yielding profit instead of loss to their owners, toning up the general neighborhood and increasing the taxable values of the community.

Work of this character may easily be secured, for there is not a hamlet in the country so small but has structures susceptible of profitable improvement; and, as a rule, the amount of money required is such as to enable the property-owner to finance himself.

One building material organization—the National Terra Cotta Society—alert to its opportunity, is urging its members to actively seek business of the nature above described; and it is a fair assumption that other bodies will act similarly, with the inevitable result that the building industry of the country will be lifted from the slough in which it has fallen and again assume normal proportions.

Concrete examples of how building metamorphoses may be brought about and the financial aspect of the operation were given in the July issue of CONSTRVCTION and again in the present number. This publication proposes agitating the question from month to month, confident that it can engage in no more useful service to the profession it especially seeks to serve, to property-owners generally and to municipalities, than in championing the conversion of obsolete buildings into attractive, commodious and profitable investments.

Let the architects, engineers and real estate men join hands in the broad movement, and by an intelligent canvass of their clients or prospective clients aid in the restoration of general building activity.

Studying the Building Situation

IN a serious effort to discover the primary causes for the depression in building activity in New York City and the territory contiguous thereto, a series of notable conferences, attended by municipal officials, bankers, real estate dealers, building supply manufacturers and large property-owners, were recently held here, as a result of which, it is expected, a definite plan for improvement will shortly be formulated.

These gatherings, the first in the country brought about upon so comprehensive a scale, should have a pronounced bearing upon the building industry everywhere throughout the land, and they unquestionably will; for the depression existing in New York is by no means peculiar to this city, and the character of the men selected for membership upon the various committees to deal with the numerous phases of the problem gives assurance that, when a completed plan is finally adopted, it will be applicable in principle to other centers as well, and hence building activity should be greatly stimulated from one end of the country to the other.

The United States is in an unusually fortunate condition financially; and while the primary business of its citizens is the vigorous prosecution of war; general industry must not be permitted to languish, for upon the successful activity of those at home largely depends the victorious campaigning of the men at the front.

A consumation toward which all should labor as a patriotic duty.

Recommended for Grand Rapids, Mich.

WHILE the building regulations of Grand Rapids, Mich., in the opinion of the engineers of the National Board of Fire Underwriters, who have recently completed an inspection of the city, "are fairly comprehensive, several important features are still lacking, or are inadequately provided for, particularly in limitations of areas, protection to floor and roof openings and requirements for heating apparatus."

Among other charges recommended by the engineers for the reduction of the city's fire hazards are these:

"That the building laws be revised to conform to modern requirements for construction and fire prevention as given in the 1915 edition of the National Board Building Code, especially as to the following essential features:

"Restriction of areas.

"Openings in floors and roofs.

"Protection to exposed windows.

"Heating apparatus.

"Standpipe requirements.

"That frame construction be prohibited within the fire limits, and that construction outside said limits be so regulated as to prevent the developing of dangerous conditions.

"That fire-resistive roof coverings be required on all new or repaired roofs throughout the city."

Dirty chimneys are serious fire breeders, and it behooves all concerned in lessening the fire hazard to remove accumulations of dirt in the flues. The importance of such action is emphasized by the National Fire Protection Association through the issuance of a special circular newly issued.

"An architect must be imaginative, and yet have a training along practical lines. Before the building is constructed he must draw the plans. Before the plans are drawn he must conceive a graphic picture of the structure which he is to build."

Fire Loss at Dayton, Ohio

For the twelve months ending December 31, 1916, the fire loss of Dayton, Ohio, aggregated $474,779, as against $213;042 for the previous year and $330,710 in 1913. In 1916 there were 808 fires, the average loss per fire being $587.62.

The greatest fire of the year was that at the plant of the Manufacturers' Production Company, a munitions factory, where $269,547 loss was suffered. This was nearly 57 per cent of the total fire loss for the year. The National Theatre fire occasioned $75,791 loss, and the C. E. Underwood Candy Company blaze resulted in $36,732 loss. These conflagrations represented a fire waste of $382,070, or more than 80 per cent. of the total losses for the year. The 805 fires outside of those mentioned wrought an average waste of only $140. And the per capita loss outside of these, upon a basis of 140,000 population, was only 80 cents, or, upon a basis of 150,000 population, only 75 cents for the entire year. But few fires extended beyond the places of origin, the total loss from exposure being only $4,573. Automobiles and gasoline were involved in less than one per cent. of the losses, against 43 per cent. for 1915.

To Popularize Use of Hollow Tile

THAT hollow tile as a building material has never received the full measure of recognition it merits is the profound conviction of many building experts throughout the country. An effort to remedy this condition will now be made by the Hollow Building Tile Association, which embraces in its membership sixty-five of the leading manufacturers of the product.

John A. Ferguson, an independent consulting engineer of Pittsburgh, and an eminent authority upon building code requirements, has been engaged as consulting engineer by the Association, and will assist municipal authorities and others in the preparation of building codes, emphasizing the usefulness of hollow tile in such connection.

Extensive as is the sale of hollow tile, its present demand should be multiplied manyfold, as it undoubtedly will be once property-owners and their professional building advisers are made aware of the great merit of the product.

Manager of Portland Cement Association

IN succession to the late J. P. Beck, the directors of the Portland Cement Association recently selected H. E. Hilts as its general manager.

A graduate of the University of Pennsylvania and a trained engineer, Mr. Hilts has had a varied and valuable experience in practical engineering work in various parts of this country and Mexico. Four years ago he entered the service of the Portland Cement Association as its road engineer in an important territory. So satisfactory were his services in this connection that in 1915 he was appointed the Association's engineer at San Francisco, being called from the latter post to his present position as general manager of the organization.

The Portland Cement Association is an active trade organization, and has done much to popularize the use of cement in avenues where it had not previously been used. Maintaining a staff of skilled engineers ready at all times to assist architects and others in working out building problems, the Association thus far has more than justified its existence, and it's a safe assumption that its usefulness will be still further enhanced under the direct administration of Mr. Hilts.

Concrete Construction as Affected by Sea Water

"ENGINEERING NEWS-RECORD" of September 20th contained the first of a series of articles by Rudolph J. Wig, of the United States Bureau of Standards and Lewis R. Ferguson, of the Portland Cement Association, on the deteriorating effect of sea water on concrete and on the steel re-inforcement of reinforced concrete.

CONSTRVCTION presents to its readers a summary of the article for the reason that the extent and thoroughness of this investigation and the importance of the conclusions drawn therefrom are beyond compare. These two highly qualified engineers made a personal inspection and close study of "nearly every concrete structure in sea water in the continental limits of the United States, besides a great number in Canada, Cuba and Panama." The investigation took two years' time and was conducted by Messrs. Wig & Ferguson under the auspices of the United States Government. In addition to the structures personally examined, "detailed information has been secured through American consular officers on the methods of construction and present condition of concrete works in various harbors all over the world."

The engineers list 146 structures which they personally examined. Of these 49 were on the Pacific Coast from Vancouver, B. C., to San Diego, Cal.; 15 were on the Gulf Coast from Port Arthur, Texas, to Key West, Fla.; 9 were in Havana, Cuba, and 73 were on the Atlantic Coast line from Brunswick, Ga., to Nova Scotia.

These inspections embraced practically every type and design of concrete structure, both plain and reinforced, subjected to practically every climatic condition from the tropical or sub-tropical of the Gulf of Mexico and Southern California to the cold water conditions of Vancouver, B. C. and Nova Scotia.

Without question, therefore, the study and investigation of concrete structures conducted by Messrs. Wig & Ferguson is the most complete and exhaustive ever undertaken and their findings and conclusions have, in the words of "Engineering News-Record," "commanding authority."

In the first of the series of articles they state that their conclusions demonstrate the following important facts:

1st—Permanency for plain and reinforced concrete can be obtained under most, but not all, conditions of exposure.

2nd—All concrete in sea water, both in Northern and Southern climates, is subject to chemical disintegration under certain conditions.

3rd—Reinforced concrete of excellent quality, designed according to recommendations of engineering societies and present practice, is subject to relatively rapid deterioration in most localities.

4th—The materials and methods used in construction have an important bearing on the durability of concrete, and the design and the protection provided influence greatly the permanency of the structure.

These basic conclusions are highly important, but are wholly warranted, in the opinion of Messrs. Wig and Ferguson, from the great mass of data secured.

Their investigations included learning the facts regarding "the methods used in construction; the materials of which the concrete was made; the amount of water used in mixing; the past and present conditions of exposure; the salt content of the water, and, in fact, all the details which can only be secured by a careful examination of the structure, viz., studying the specifications, drawings, records, and photographs made during construction and by interviewing those actually in charge of the work."

How thoroughly this part of their investigation was conducted and how complete the data so secured is indicated in the language of the article. "The conditions under which the present investigation was possible extent were all the facts made available." made were extremely fortunate, for to the greatest

Messrs. Wig and Ferguson, in stating the foregoing conclusions, disclaim any intention to demonstrate that concrete cannot be used for marine structures. On the contrary, they express the opinion that it is "a most economical material to be used if it is made so as to successfully resist sea-water action, and it is their opinion that it can be made so."

In succeeding articles Messrs. Wig and Ferguson purpose pointing out how "trouble can be obviated in the future and more durable structures built of concrete."

"Engineering News-Record" very properly says in the course of its editorial comment: "Important at any time, the work of Messrs. Wig and Ferguson assumes a new significance now, when the unprecedented prospect for America's merchant marine gives an added impetus to the construction of wharves, docks and harbor works of all types."

The increasing popularity of concrete construction is sufficiently attested by the great demand for cement; a demand that promised to continue indefinitely. The usefulness of the product for industrial, mercantile, residential and farm building construction is becoming better known every day.

Turning Building Losses Into Profits

AMONG the numerous "Doing-Our-Bit" movements sweeping over the country, most of which involve a praiseworthy personal sacrifice or financial loss, there has been one suggested by the National Terra Cotta Society of New York, whose members manufacture architectural terra cotta, through its executive secretary, Arthur B. Pendleton, a plan which enables those who own old buildings to substantially contribute towards the heavy wartime burdens of city, State and Federal governments and at the same time improve their own financial condition.

There are thousands of people in New York and other cities who own old buildings with dilapidated fronts of from four to five stories in height on which they have been taking losses for years. These buildings are seldom occupied to an extent that the taxes, interest and other expense charges are met by income derived from rentals, the owners holding them in hopes of eventually being able to sell at a profit. These fronts are not alone an eyesore to the community but a positive hindrance to improvement in neighboring valuations and by their continued progress of decay prevent the individual as well as the municipality from reaping a full measure of returns from income and taxes. This is unintentional poor citizenship, but in the interest of efficiency alone, especially in cities of geographically restricted areas, it should not be permitted. Some method ought to be devised to justly penalize menaces of this character and to stimulate and reward a removal of the condition.

This deplorable state of affairs is, in many instances, due to ignorance of the individual as to what can be accomplished and how little it costs to bring about an improvement which will not only turn these losses into profit-taking investments, but will in many cases pay for the expense of the alterations in the first two years and show a credit balance besides. An example of this is strikingly illustrated in the accompanying photograph and table of figures based on two years' actual experience.

The building in question was of the usual ugly brown-stone front type and had gone through its various stages of usefulness and disintegration, finally to become a total loss as an income-producing property. The front was removed by an alteration and replaced by an unpretentious but attractive one of architectural terra cotta at a very moderate cost, resulting in a twenty-one year lease, with an option of renewal for a like period at a handsome profit. It has converted an eyesore into a beauty spot; improved the valuation of its own and adjacent lots and provided the municipality with a proportionate increase of income through increased valuations.

These improvements need not be deferred due to wartime considerations affecting some building materials, for they can be made by masonry construction and the use of clay products, such as architectural terra cotta and brick or stucco for the exterior, without embarrassing in the least the Government in its unusual requirements or drawing on a necessary reserve of the nation's resources. Nor need they be postponed due to a consideration of high prices, for in these materials prices have remained normal and deliveries are prompt.

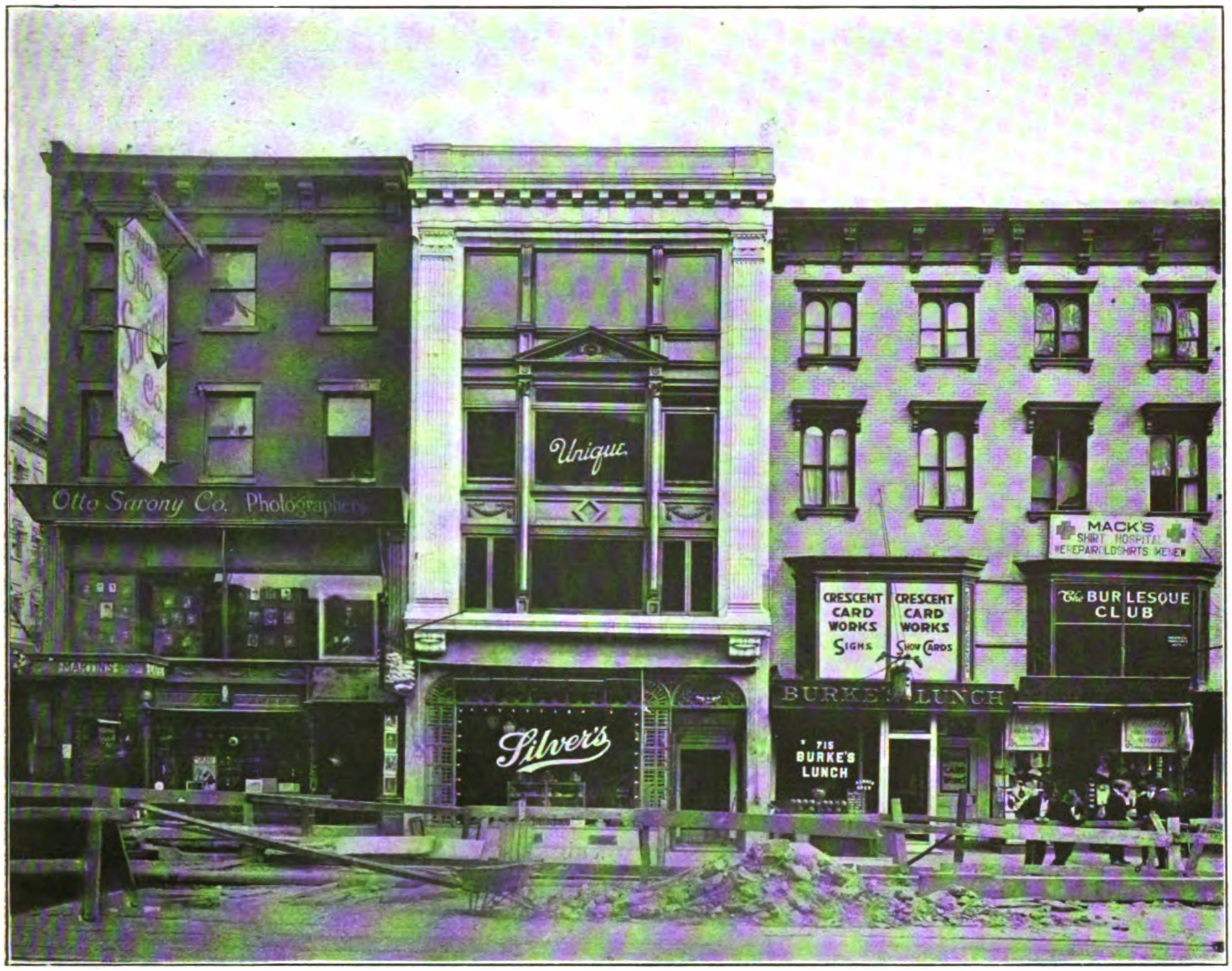
The Government through various bodies has expressed a desire that builders refrain from the use of steel and other materials in building construction, therefore building now with the use of material not required to an appreciable extent by the Government fulfills a requirement of good citizenship. "Business as usual," with a helpful rather than an embarrassing outcome.

The possibilities of these alterations, aside from their practical or monetary considerations, is positively fascinating. Under the guidance of architects at relatively low cost, old, unsightly fronts are sheathed for a time with scaffolding, often with no interference to a continuation of an established business. They emerge later beautiful to behold, revealing delicately modeled pilasters or columns supporting appropriate cornices, with here and there ornaments or medallions or even panels in those exquisite colors so much used abroad, but, sad to relate, so seldom seen in American architecture. The premises thus reborn make a compelling appeal that creates trade for a business where there was none or tenancy for premises where vacancy prevailed.

It would be eminently proper at this period of general business depression for architects to utilize the services of draftsmen and other employees in canvessing owners of properties such as those above referred to in the interest of general betterments.

From the concrete case given upon the opposite page, which is but one of hundreds of like nature throughout the country, the details doubtless of which could be had from the files of the National Terra Cotta Society, the wisdom of making frontal property improvements can easily be shown, both from an artistic and (what is more convincing to the business man) from a financial point of view.

While the return to the architect from individual work of this character would be small, in the aggregate it would amount to a very substantial sum, and unquestionably would be the means of securing more remunerative work later on, for owners of small buildings very frequently are also the builders of larger structures, and it's a safe assumption that the architect who made money for his client in one direction would be borne favorably in mind for bigger things.



Example of Architectural Terra Cotta Alteration and the Economics of the Change

Income for one year prior and subsequent to improvement.

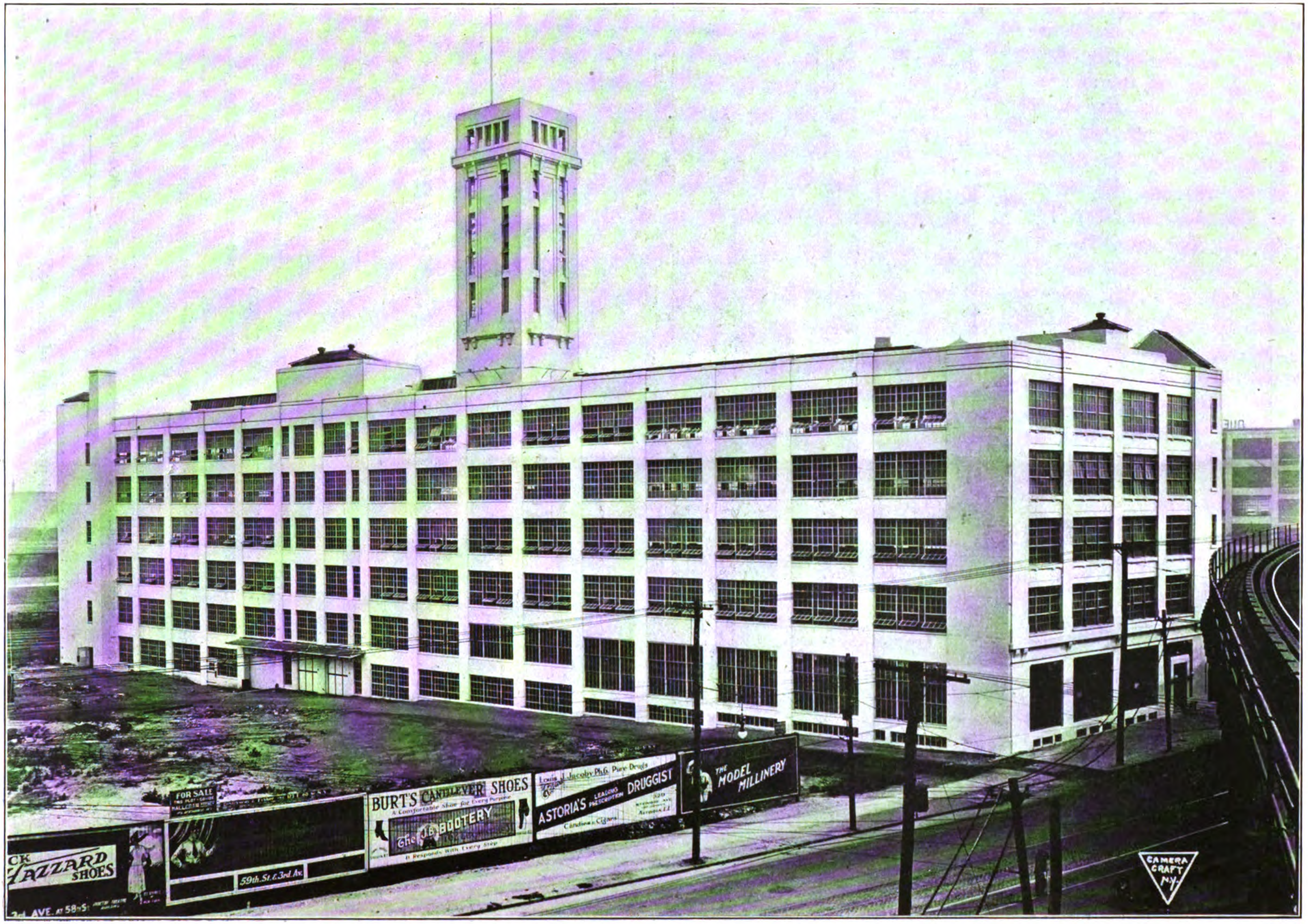
	Prior	Subsequent
Assessed Valuation	$86,000.00	None made since improvement
Taxes	1,737.20	$1,737.20
Rentals	vacant two years	5,000.00 first year—up to $10,000.00

Prior annual loss $1,737.20 and interest. Subsequent annual profit over $3,262.20

Cost architectural terra cotta alteration about	$1,100.00
Cost other front alteration about	1,900.00
Total	$3,000.00

Alteration paid for first year and profit shown of $262.20.

Lease made for twenty-one years at five to ten thousand dollars per annum, with option of renewal for like period at five per cent increase on assessed valuation.



Industrial Plant, J. K. Stewart Estate, Long Island City. Ballinger and Perrot, Architects and Engineers

An Attractively Designed and Substantially Built Industrial Plant

A HAPPY blending of the artistic and the utilitarian in industrial building construction is afforded by the recently erected plant of the J. K. Stewart Estate, at Long Island City, the completion of which has added greatly to the general attractiveness of the section of the community in which the property is located, and which must serve as an inspiration to other interests contemplating the erection of manufacturing structures.

In exterior and interior design the building represents the latest word in industrial plant construction, and reflects high credit upon those responsible for its conception and completion.

Planned to meet the needs of a particular industry—the manufacture of automobile appliances—the building as well ministers to the safety and comfort of its occupants, being fireproof, abundantly lighted and ventilated, and highly sanitary throughout.

With a frontage of 80 feet on Jackson Avenue and a depth of 345 feet, the main building is five stories and basement in height. A one-story annex covers a further 80 foot frontage with a depth of 184, feet. For convenience in shipping a platform extends along one side of the smaller building running into the basement of the larger structure.

The main building is erected entirely of reinforced concrete with spiral reinforcement in the columns, and slab floor construction, designed according to the Norcross patent. Pipe sleeves are built into the concrete for running piping in order to obviate the cutting of concrete. Tapped sockets are also built into the slabs for hanging the piping and for the safe and convenient placement of machinery.

A 12" reinforced concrete wall divides the building through its center; the openings on each floor being safeguarded by a set of standard fire doors, one placed upon each side of the wall. One type of door is sliding, the other hinged. To insure the safety of the employees in the event of a fire alarm three fireproof stair towers are provided; one at either end of the building, and the third located close to the fire wall; the stairs are of easy descent and have platforms at fixed intervals. All stairs are of reinforced concrete with cement finish, and have safety treads embedded to form a non-slip nosing. A pipe railing extends upon either side of the stairway, affording an added sense of security.

All interior partitions are of concrete, the use of combustible material being conspicuous by its absence.

In all parts of the building, save only the toilet and wash rooms, the floors are of cement, which is made wear and dust proof through use of "Metallic Hardener." The toilet and wash rooms floors are of marble terrazzo with cove base, and are graded to the urinals or to the cesspools.

The boiler and pump room, together with the coal storage bin, are located in the basement along the railroad siding, thereby facilitating the receipt of coal and other supplies for the department. The boiler stack is built of concrete walls lined with hollow radial brick.

Window Construction

In the important matter of window construction rolled steel was used throughout the entire structure, except in the bulk windows in front, the latter having drawn copper sash. All transoms, transom sash and doors in the office division are likewise of drawn copper. In the office portion of the first floor the windows are of the counterbalanced type, all others having pivoted ventilators. Polished plate glass is used upon the office windows, including the bulk windows, and one light in each sash, which occurs at the eye line; throughout, the entire structure is glazed with polished wire glass, the remaining lights in each sash being glazed with one-quarter inch rough wire glass.

The pivoted sash of monitors are similar in construction and a portion of the roof is equipped with sawtooth skylights, the bars and cappings of which are of asbestos protected metal. . Skylights of like character are provided over stair towers and are protected with wire screens.

The liberal use of wire glass in the windows and skylights acts as an efficient barrier against external fire, the windows, encased as they are in metal frame, resisting a high degree of temperature; flying brands or embers cannot find lodgment within the structure when the windows are closed.

A carefully designed tower rising from the roof near the center of the building is a distinctive feature and adds to the general attractiveness. The tower, moreover, encloses the supply tank, thus covering its unsightly appearance. The ornamental tower rises 75 feet above the roof, and in turn supports a steel flagpole of equal height, from the summit of which "Old Glory" may be counted upon to wave upon all proper occasions. At night the tower will be brilliantly illuminated with electric lights, forming a conspicuous landmark for miles about.

Automatic Sprinkler System

Although built of incombustible materials throughout, the management of the property yet appreciated that the menace of a contents fire always exists in an industrial plant, and for the purpose of reducing this hazard to a minimum a complete automatic sprinkler system (Esty head) has been installed in the building, which can safely be counted upon to be sleeplessly on guard against incipient fire. Supplied by the 40,000 gallon steel tank in the tower, sprinkler piping covers each floor, the sensitive "heads" being paced at fixed intervals of ten feet in each direction.

A standpipe extends through each fire tower, with hose reels conveniently placed upon each floor. Provision for steamer connection is made outside the building, the entire water service being connected with an approved underwriter's electrically driven pump of 1,000 gallons per minute capacity.

To get rid of the water flow in the event of fire, each floor has scuppers through which the water drains directly, the pipe sleeves raised two inches above the floor level preventing leakage from floor to floor.

A thoroughly modern fire alarm system is installed in the building. The service is Faraday's, electrically supervised, with storage batteries, motor generator set, all necessary control apparatus, bells, stations, etc.; each station having a code, which, when struck, rings the alarm bells all through the building and at the same time designates the exact location of the fire.

A still further safety measure is the complete watchman's clock system with which the building is supplied; the required number of stations are located on each floor, with the master clock placed in the general office.

Exterior Ornamental Features

As has already been said in the opening paragraph, while utility and safety were the prime considerations in the planning of the Stewart Building, due attention was paid to the artistic feature, the general result being a most happy one.

All exterior ornamentation, such as cornices, band courses, conning and other features are skillfully executed in concrete, the crude material being finished with white cement paint of a superior quality and brilliancy.

Plumbing Fixtures

In designing the sanitary arrangements the architects exercised unusual care, the result being that the plumbing equipment throughout the structure is of superior merit. The water closets upon each floor are of the flushometer type, with seat action. Lavatories are of vitreous enamel, while the urinals are of solid porcelain. Bubbling drinking fountains with china basins are located at frequent intervals upon every floor. Hot and cold water is supplied the lavatories, all piping being covered to prevent either loss of heat or condensation. The lines are valved so that any part of the system may be shut off independently and repairs made without serious inconvenience. Floors of toilet rooms are graded to drain into urinals or cesspools, so they may be easily flushed and drained, and thus kept thoroughly clean. Partitions around the water closets are of slate.

Method of Heating Property

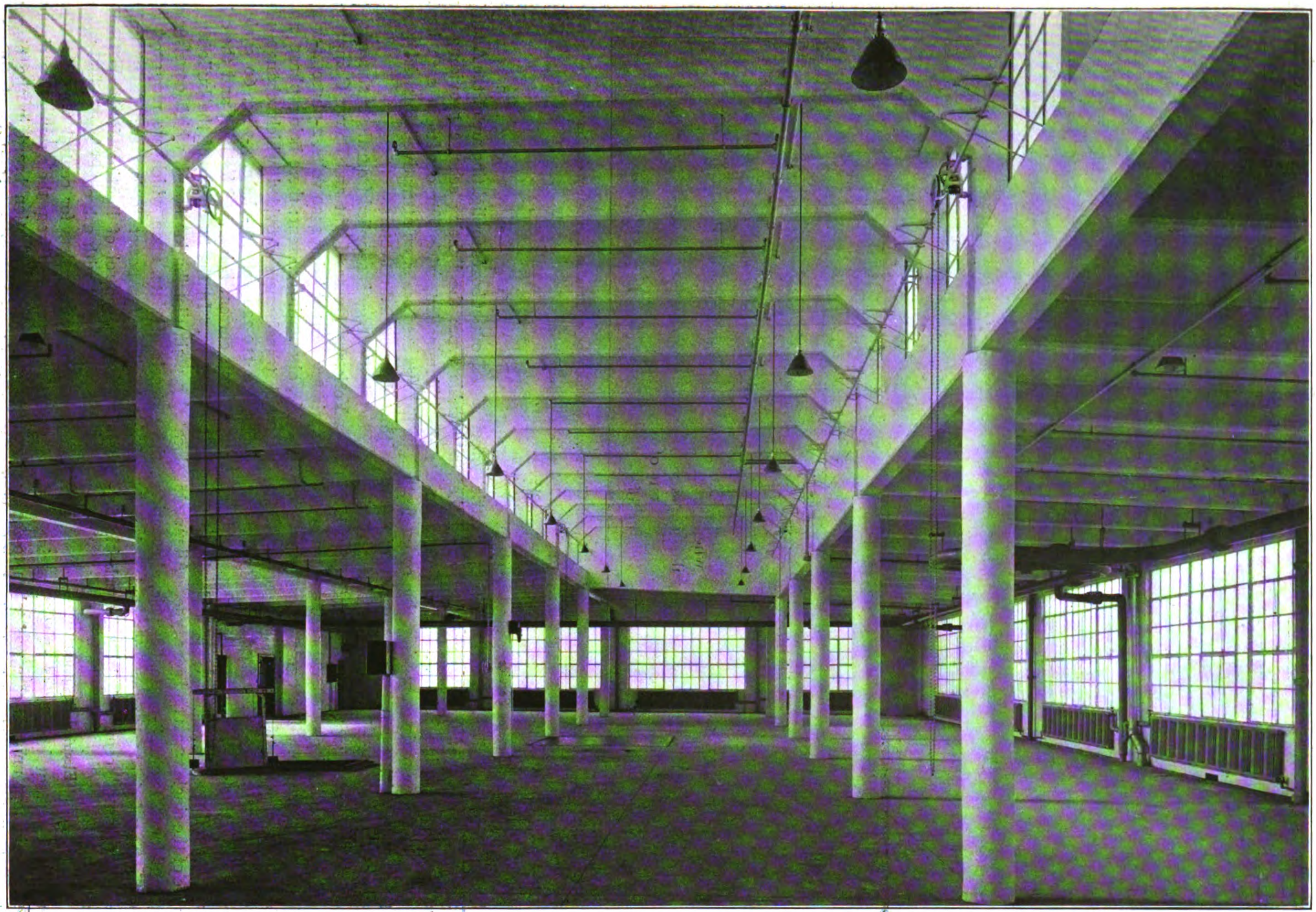
Through the installation of a Warren-Webster low vacuum steam system, with direct radiation, the building is scientifically heated; the method employed being sufficient to create a temperature of 70 degrees Fahrenheit in the most severe weather. Steam is furnished from two brick-set 72" x 20 ft. Kewanee Smokeless boilers, arranged to burn either anthracite or bituminous coal. Boilers are driven at from fifteen to twenty pounds pressure to operate the pumps, the heating system being supplied through a pressure reducing valve at two pounds pressure.

The boilers, designed for a working pressure of fifty pounds, are equipped with high-pressure fittings and trimmings for future high-pressure service. The boiler and vacuum pumps are of special design to operate at fifteen pounds steam pressure and are automatically controlled.

The heating system is a down feed, overhead main service with each riser valved so that it may be cut out of service without interfering with the operation of the remainder of the building. The piping used is genuine wrought iron, standard weight, with cast iron fittings. Pipe work over six-inch size is flange-equipped. To prevent heat losses in mains all flow steam piping is covered with eighty-five per cent magnesia composition.

Generating Hot Water

A plentiful supply of hot water for domestic purposes is assured through the operation of a Kewanee Smokeless down draft boiler, of the same general type though of smaller size than that with which the heating plant is supplied. The boiler is connected with an I. B. Davis and Sons' hot water heater, which latter is able to raise the temperature of 1,000 gallons of water per hour from 50 to 180 degrees Fahrenheit, and has a storage capacity of 212 gallons. Condensation from the heater is returned to the boiler. The smaller boiler is designed for use in the Summer months only, steam being secured from the heating plant instead when the latter is in operation. Attached to the steam line to the heater is an Ideal Sylphon Tank Regulator, which maintains the temperature of the water at 180 degrees and prevents the excessive use of steam when the temperature has been reached. The hot water generator is supplied with a thermometer for determining the temperature of the water, and a water relief valve to prevent excessive pressure upon the heater through rising temperature of the water.



Typical floor in the J. K. Stewart Estate Building, Long Island City, showing arrangement of windows and automatic sprinkler system, insuring plenty of light and ventilation and safety against fire

Ballinger and Perrot, Architects and Engineers

Floor in J. K. Stewart Estate Building, Long Island City, showing solidity of construction and safety elevator door

Ballinger and Perrot, Architects and Engineers

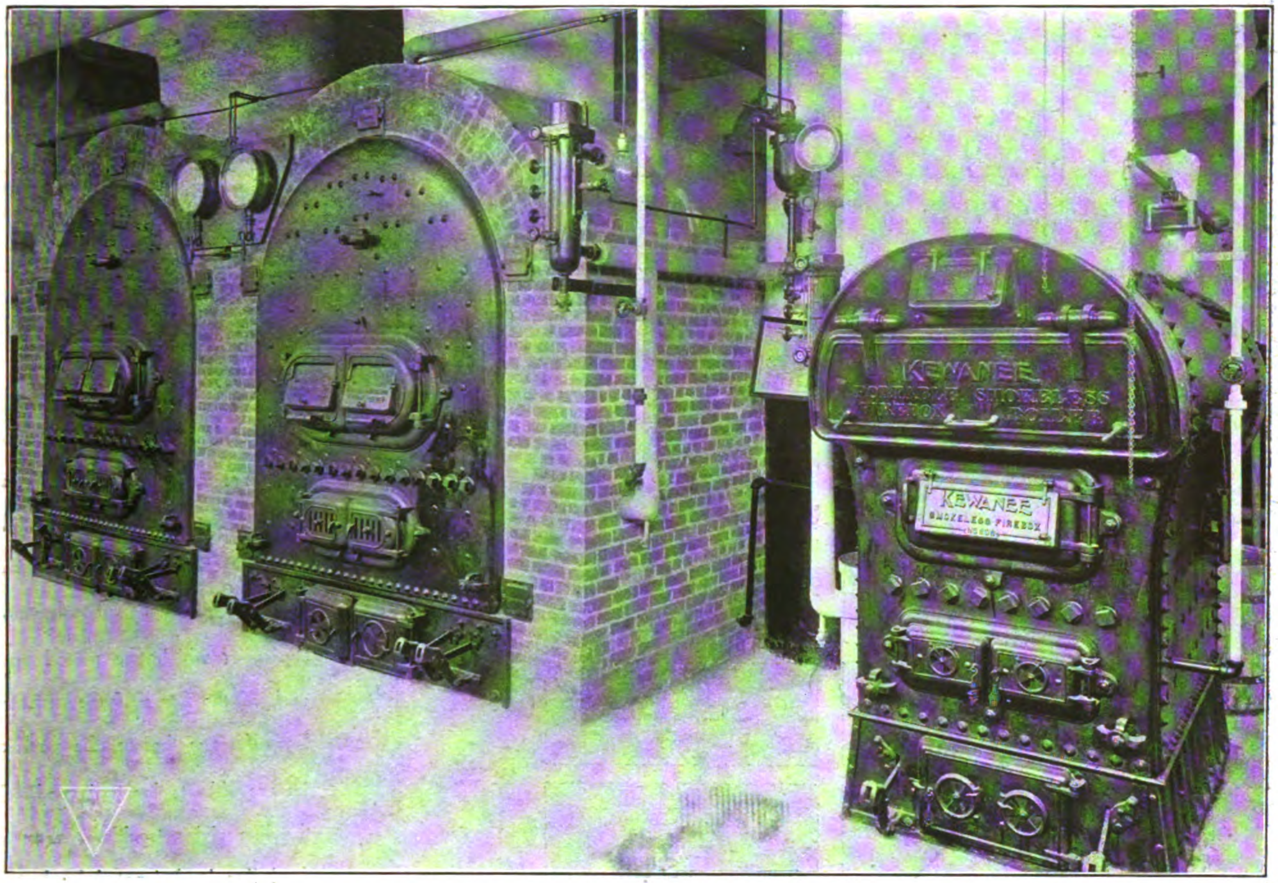
Elevator Service

The building is equipped with four Otis Electric elevators—one designed for passengers only and the other three for carrying freight. In size the passenger elevator is approximately eight by seven feet platform size, and has a carrying capacity of 4,000 pounds at 250 feet per minute. The largest of the three freight elevators, with a platform of 10.8 x 17.9, has a carrying capacity of 10,000 pounds at a speed of 65 feet per minute. The two smaller freight elevators have a capacity of 7,000 and 3,000 pounds, at a speed of ninety and one hundred and fifty feet per minute respectively. The passenger elevator is of the duplex and worm and gear type, while the freight cars are of the single worm and gear type. All motors are wound for 220 volts, 3-phase, 60-cycle, alternating current. The freight elevators are equipped with "Peelle" patented counter-balanced truckable fireproof doors.

Electrical Equipment

In the important matter of electric wiring and general equipment unusual care was taken to secure safety and efficiency. All wiring in the building is run through enameled steel conduits, fastened to the structure by means of clamps secured in concrete inserts. All outlet boxes for lighting are of the Adapti adjustable type; the lighting scheme providing for general illumination, with four outlets in each bay. The fixtures used are of an attractive industrial type, with steel enameled reflectors.

Electrical energy is supplied from the mains of the New York and Queens Light and Power Company, the primary current being 2300 volts, 2-phase, 4-wire, 60-cycle, alternating current; there being phase and potential transformers provided which change the current to 110-220 volts, 3-phase, 3-wire, 60 cycles, the 110 volt current being used for light and the 220 volt for power. In the basement of the building is located a main distribution board, which consists of three panels of slate, upon which are mounted oil circuit breakers for power feeders and fused knife switches for the control of lighting feeders. Each elevator is equipped with a breaker and two circuit breakers for power feeders for central control. The elevator feeders are run from their respective circuit breakers on main distribution board in the circuit to the pent house above the roof, there terminating into a second oil circuit breaker mounted on a slate



Boiler equipment installed in J. K. Stewart Estate Building, Long Island City

Ballinger and Perrot, Architects and Engineers

panel. The light-feeders are run through the building in circuit, each feeder taking a certain group of panels, so that in case a feeder or main fuse should burn out it would not leave the building totally dark, there always being another feeder to each floor with a separate group of panels.

Central power feeders are run up from the main distribution panel in the basement to power distribution panels on each floor, these panels being located at the most convenient points for individual or group motor drive.

A complete conduit system for telephones is installed in the office section of the building, all conduits being run under the floors with outlets beneath desks and tables as desired, and terminating in the floor beneath the telephone exchange.

To facilitate necessary repairs and reduce the cost of their making, a colored chart system has been devised by which each line of pipe and its function may be immediately determined; these charts are hung upon the wall in each floor and are readily understandable.

Doors and Rolling Shutters

To safeguard against fire communicating from one portion of the building to another, all large openings throughout are protected with rolling steel shutters; the same equipment being used upon the railway siding and the shipping platform. Should fire happen to break out at any point, its isolation would be promptly secured through the operation of this equipment.

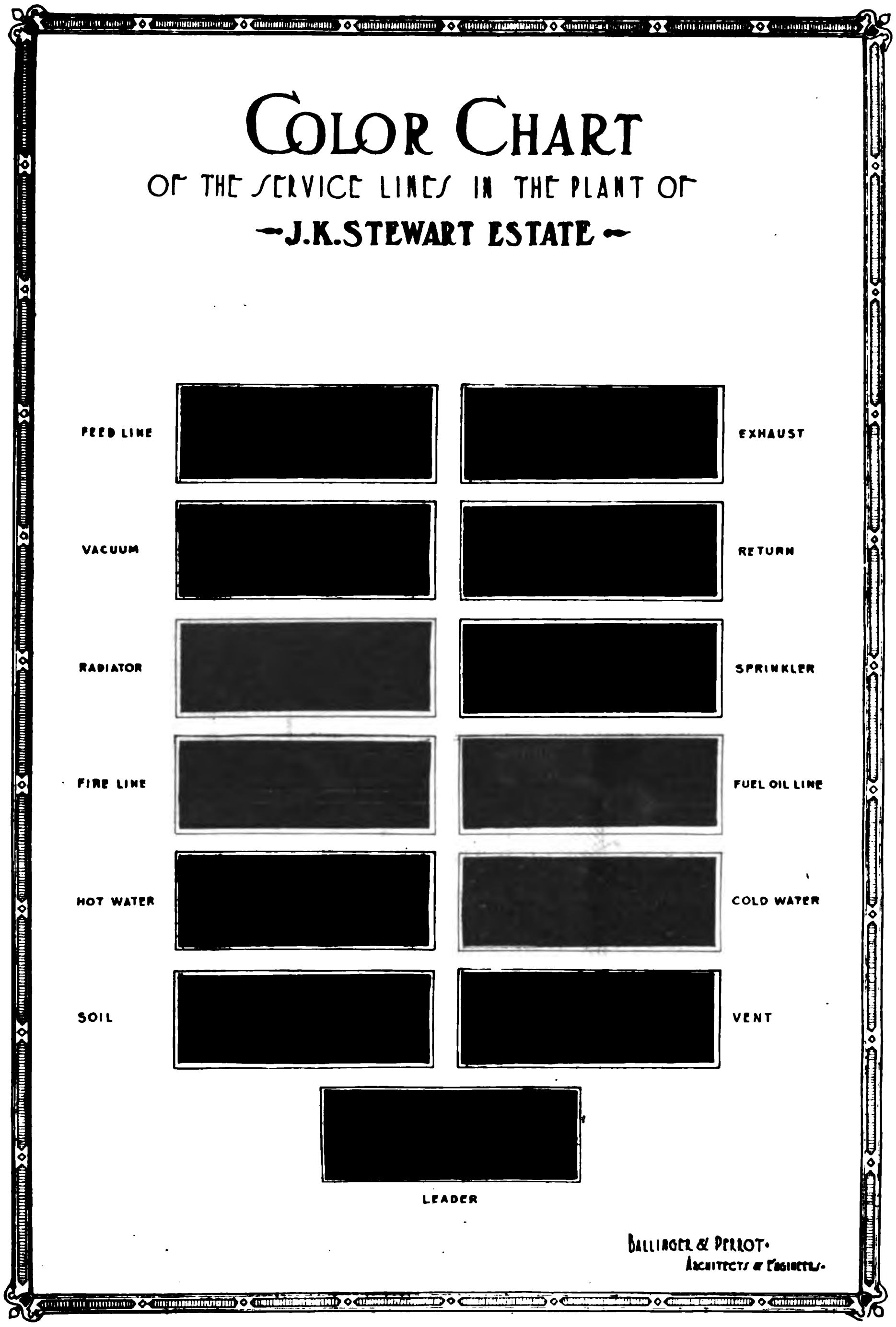
Interior and exterior elevator doors are of the "Peelle" counterbalanced metal type. Doors leading to stairways, toilet and other rooms are of kalamein with steel frames.

A further innovation in the building the value of which is readily appreciated, is a series of gravity spiral conveyors upon which stock is carried from floor to floor promptly, safely and with a minimum of labor on the part of the employees.

In keeping with the general firesafe and durable character of the property, its roof was laid of Barrett product and according to the specification of that company. In all 27,600 square feet of roofing was used.

The above description refers to the main building, although the construction and equipment features apply in all essential particulars to the one-story annex as well. This latter extension is built of brick walls, with reinforced floors and roof.

Plans for the Stewart building were designed by Ballinger & Perrot, architects and engineers, New



COLOR CHART
OF THE SERVICE LINES IN THE PLANT OF
—J.K.STEWART ESTATE—

FEED LINE — EXHAUST
VACUUM — RETURN
RADIATOR — SPRINKLER
FIRE LINE — FUEL OIL LINE
HOT WATER — COLD WATER
SOIL — VENT
LEADER

BALLINGER & PERROT·
ARCHITECTS & ENGINEERS·

Of distinct service in the event of repairs being needed to any one of the various service lines throughout the Stewart Building, the architects prepared a colored chart, copies of which are posted upon each of the floors of the structure. By reference thereto, the mechanics are able to locate immediately the line giving trouble. Thus the feed line is designated by brown, the vacuum line blue, fire line red, sprinkler line silver, etc., etc.

York City and Philadelphia, which firm also supervised the erection, the immediate direction being entrusted to John H. Bull, their resident engineer at this city. Jacob A. Zimmerman & Son, Inc., New York City, were the builders.

Cleveland, Ohio, continues to hold an honored place as a building center, new structures in large number having been planned for that city.

Must Have Sprinkler Protection

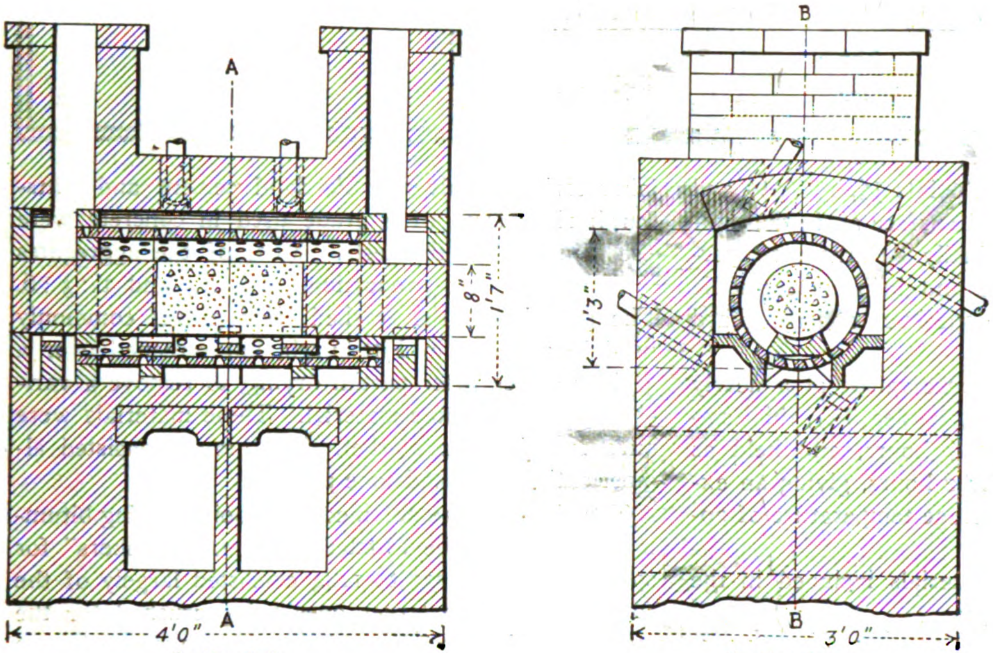
WHILE the ordinance prohibiting the erection of other than fireproof buildings in the main business section of Portland, Ore., has been repealed and the construction of buildings up to four stories in height permitted, it is expressly stipulated that such structures be provided with fireproof walls, and that an automatic sprinkler system be installed upon each floor. The change has agitated the building fraternity for some time and is in the nature of a compromise measure.

A Comparison of the Heat-Insulating Properties of Materials Used in Fire-Resistive Construction

By W. A. Hull

Prepared for American Society of Testing Materials

THIS investigation was preliminary to the investigation of the fire-resistive properties of full-size columns, etc., and was intended as a study of the insulating properties of the materials commonly used as protective coverings for steel. Many data are available as to the conductivity, specific heat and other thermal properties of such materials, particularly of clays and concretes. Some of the best information regarding these propeties has been supplied by Prof. Charles L. Norton.[*] Satisfactory data on the conductivity of burned clays is plentiful. The laws of heat flow are such, however, that calculations intended to compare the insulating properties of materials, in which various physical and chemical changes would take place at temperatures to be reached in heat exposures under contemplation, would necessarily be exceedingly complex, even if the thermal effects of these various changes were known quantitatively, which is not the case.



Section.B-B.

Section A-A.

Fig. 1.—Furnace for Testing Specimens

Method of Testing

The most promising method, as well as the simplest, seemed to be that of subjecting a number of specimens of the materials to the same heat treatment, measuring temperatures at definite points within the specimen while the test was in progress. For this purpose all materials were made up into specimens of cylindrical form, 8 inches in diameter by 16 inches long, provided with four holes, ¼ inch in diameter, extending through the piece longitudinally, for thermocouples. A gas-fired furnace, shown in Fig. 1, was built for the purpose. It was long enough to take three 16-inch cylinders placed horizontally, end to end. The test specimen was in the middle with a cylinder of material of low thermal conductivity at each end. Cylinders were placed with their ends in contact and the joints were covered with asbestos cement. This arrangement was intended to reduce end-flow of heat in the test specimen to a minimum.

The furnace was heated by four pairs of gas burners, so placed that their flames impinged obliquely on the furnace walls, crown and bottom, giving the furnace gases a tendency to flow annularly, without impinging on the specimen. In order to further equalize the heating of the specimen, both by convection and radiation, the specimen was surrounded by a perforated guard ring of fire clay. The furnace gases, having expended their first force in their annular travel around the outside of the guard ring, were drawn through the perforations with reduced velocity by a feeble stack draft. By this arrangement it was possible to give the specimen fairly satisfactory heat treatment.

Temperatures within the specimen were measured

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[*] "Some Thermal Properties of Concrete," *Journal*, Am. Soc. Mech. Engrs., June, 1913.

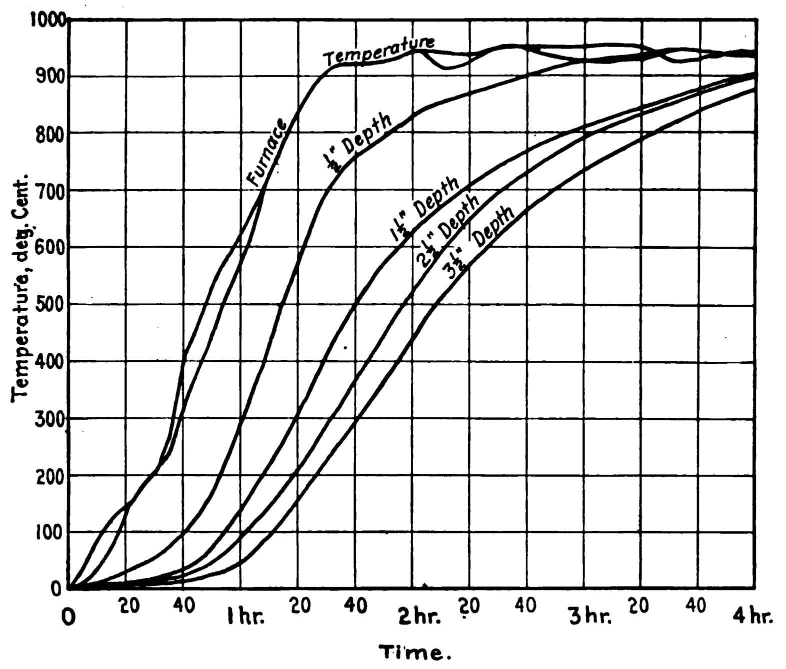


Fig. 2.—Temperatures at Various Depths in Specimen—Dense Burned Clay

by means of thermocouples, at points ½, 1½, 2½ and 3½ inches from the cylindrical surface all in the middle of the specimen longitudinally. Furnace temperatures were measured above and below the middle of the specimen, between the specimen and the guard ring.

The furnace temperatures were raised at a nearly uniform rate to 927 deg. C. (1,700 deg. F.), this temperature being attained in 1½ hours, and held as nearly constant as possible for 2 hours, giving an exposure of 3½ hours, at an average temperature of approximately 700 deg. C.

Materials Used.—The materials included in the investigation were as follows:

1. Clays that are used in the manufacture of hollow-tile fireproofing;
2. Concretes, including two proportions of a number of aggregates;
3. Gypsums, including specimens from three manufacturers, prepared from mixtures differing in kind of filler and in the ratio of plaster to water;
4. One specimen of lime mortar;
5. One specimen of a new material.

In most cases three specimens of each material or mixture were tested.

The clay for making specimens was furnished without charge by the National Fireproofing Company from their Standard Works at Perth Amboy, N. J., and by the Whitacre Fireproofing Company from their Chicago and Waynesburg, Ohio, plants. Clay specimens were made and burned in the Pittsburgh Laboratories of the Bureau of Standards.

All concrete specimens were made up in the same laboratories. Universal Portland cement and Pittsburgh river sand of a grade used in concrete were used throughout the tests. Most of the aggregates were used in two proportions, 1 : 2 : 4 and 1 : 3 : 6. The gravel was the washed river gravel commonly used in concrete in Pittsburgh, but screened over a ½-inch screen after partial drying, to remove a variable quantity of fine material. These materials were purchased in open market. The gravel consisted almost entirely of sandstone pebbles.

The cinders were obtained from boilers using bituminous coal from the Pittsburgh seam. "Clinkers" for specimens Nos. 1232 to 1244 consisted largely of the fused cinders, the larger ones being crushed for the purpose. Cinders for specimens Nos. 1291 and 1292 were passed over a ½-inch screen to remove the fines, the large pieces being crushed, the fines from the crushing being included. Cinders for specimen No. 1291-A were unscreened pile run, with the large pieces crushed.

The limestone was donated by T. K. Morris, Pittsburgh, Pa., and shipped from quarries at West Winfield, Pa. It was a high-calcium limestone.

The trap rock was from the vicinity of New York City.

Blast-furnace slag was donated by the Du Quesne Slag Products Company. It was crushed bank slag.

The concrete specimens were made by experienced men and approximately the same consistency was maintained, which was about that resulting from the use of 8 per cent of water with dry materials. The concrete was tamped in the molds. The cylinders were left one day in the molds and six days in a damp closet, after which they were kept in ordinary workroom atmosphere, except three specimens which were stored in a damp closet until the day of testing, and three others which were stored in cans, with the atmosphere artificially kept at low humidity.

The gypsum specimens were supplied, ready made and without charge, by the United States Gypsum Company, the Keystone Plaster Company and the American Cement Plaster Company. They were stored in atmospheric conditions until tested and given reasonable time for drying out.

The lime-mortar specimen was made in the laboratory. It was alternately wet and allowed to dry to promote setting, and finally seasoned for several months.

The new insulating material was received ready made and allowed to season thoroughly before test.

Results of Tests

Figs. 2 to 8, inclusive, are given to show characteristic thermal behavior of classes of materials. Figs. 2 and 3 show contrast between the behavior of a dense

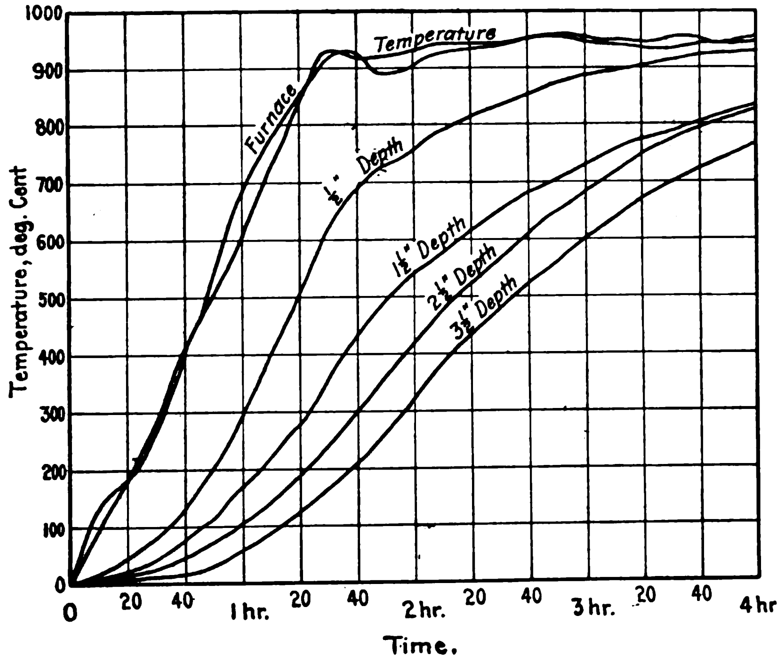
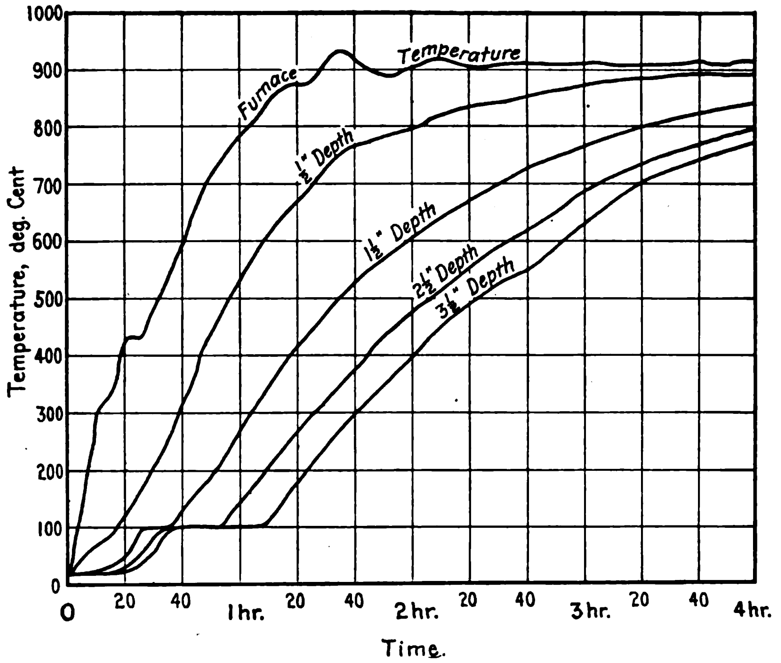


Fig. 3.—Temperatures at Various Depths in Specimen—Porous Burned Clay

Fig. 4.—Temperatures at Various Depths in Specimen—Gravel Concrete



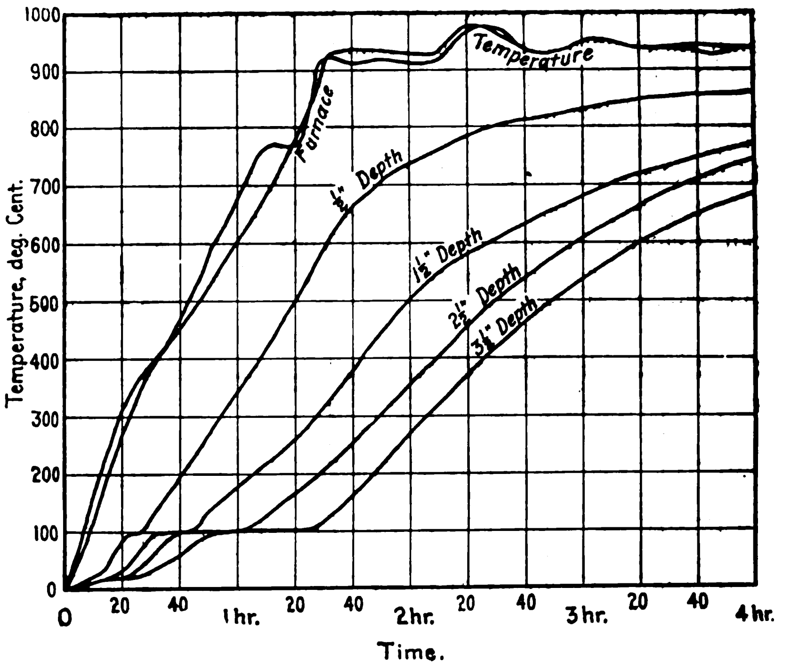


Fig. 5.—Temperatures at Various Depths in Specimen—Limestone Concrete

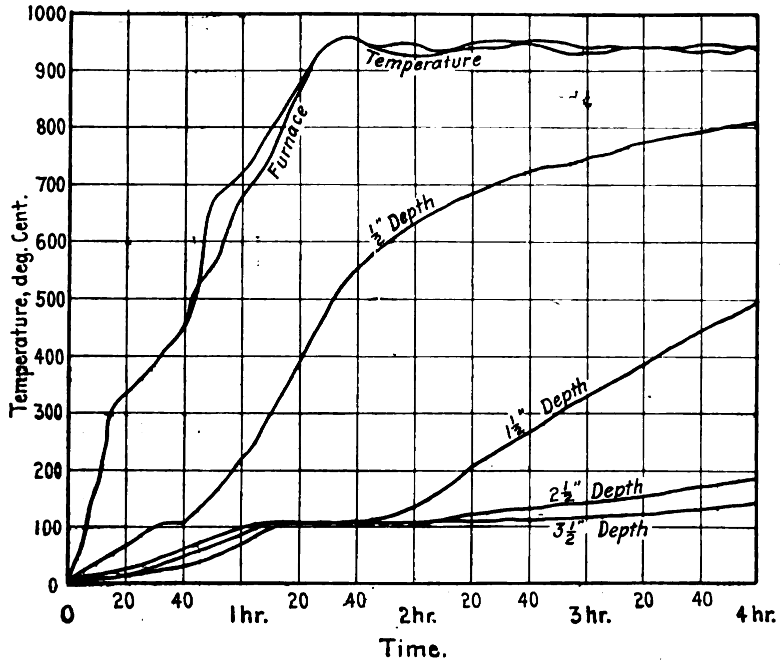


Fig. 6.—Temperatures at Various Depths in Specimen—Gypsum

and a porous specimen of burned clay. The difference can be accounted for largely by the lower thermal conductivity of the more porous specimen.*

The two concrete specimens showed a pronounced lag at about 100 deg. C., which is attributable to absorption of heat by evaporation of water. Other changes taking place in the specimen at higher temperatures are not sufficient to give perceptible breaks in the curves. The one later break seen in each of the curves is considered a response to the break in the furnace curves.

A rather pronounced difference is to be noted in the rate of temperature progress in gravel concrete and limestone concrete, the limestone heating through more slowly than the gravel. (See Figs. 4 and 5.)

Figs. 6 and 7, illustrating the behavior of gypsum specimen, show that there is a comparatively long lag at about 107 deg. C., at which gypsum dehydrates rapidly at atmospheric pressures. This indicates that the absorption of heat by the dehydration of gypsum is an exceedingly important factor in retarding heat flow through masses of gypsum. Contrast this with the curve for the second test of specimen No. 1491 (see Fig. 8), which made about an average showing in the first test. Some allowance must be made for decreased size of the specimen due to shrinkage and cracks, but a great deal of the difference is thought to be due to the lack of the retarding influence of the dehydration.

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* Dougill, Hodsman and Cobb, "Conductivity of Refractory Materials," *Journal*, Soc. Chem. Ind., Vol. 34, p. 468 (1915).

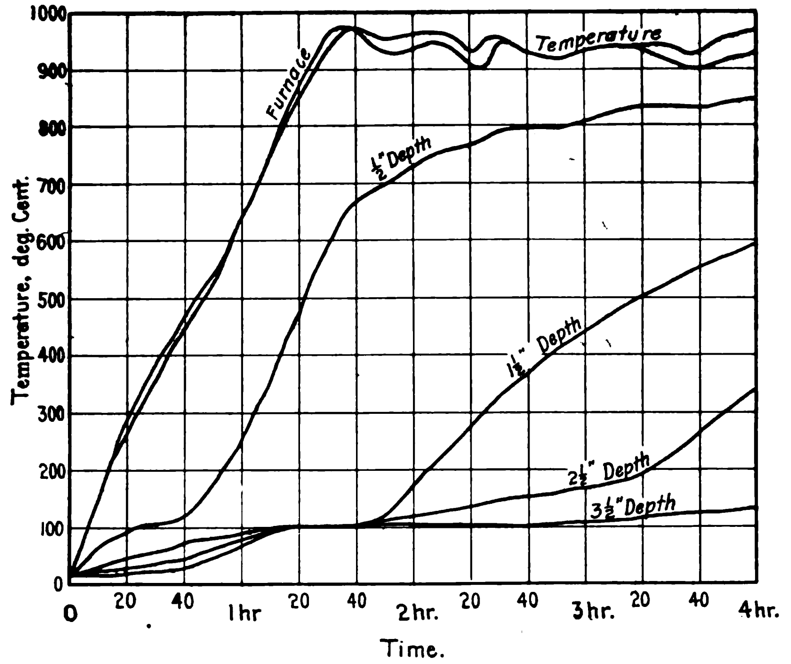
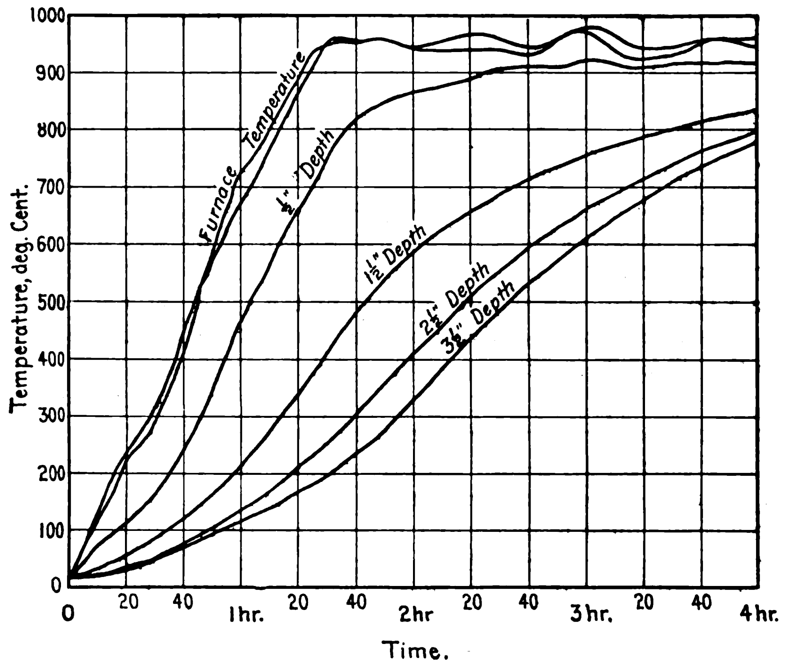


Fig. 7.—Temperatures at Various Depths in Specimen—Gypsum

Fig. 8.—Temperatures at Various Depths in Specimen—Gypsum Tested Second Time



The results of the tests have been collected and compared with the following in view:

1. To show the amount of protection afforded to relatively small steel reinforcement imbedded in a mass of the material. This is indicated by the time required for a temperature of 600 deg. C. to be attained at depths of 1½ and 2½ inches. A temperature of 600 deg. C. is selected as the danger point for steel, based on a preliminary work by Dr. C. W. Kanolt,* in which it was shown that steel tubes, tested in a heated condition in compression, lost approximately 50 per cent of their strength at 635 deg. C.

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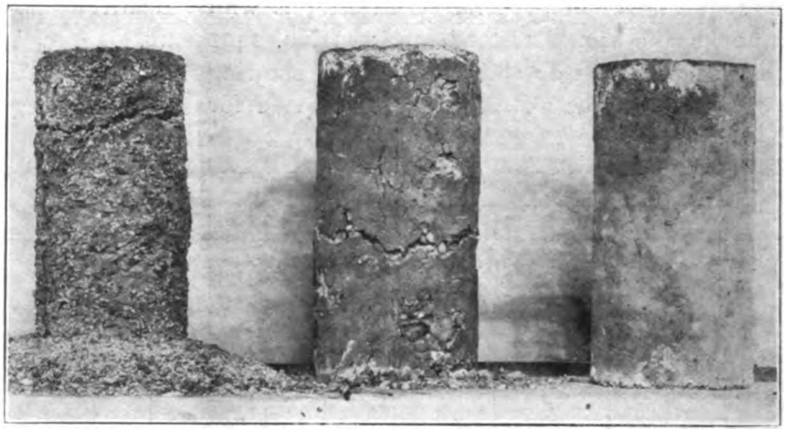
* *Bulletin*, Bureau of Standards.

Fig. 9.—Characteristic Appearance of Burned Specimens:

(a) Specimen No. 1262—Limestone Concrete

(b) Specimen No. 1214—Gravel Concrete

(c) Specimen No. 1233-a—Cinder Concrete


(a) (b) (c)

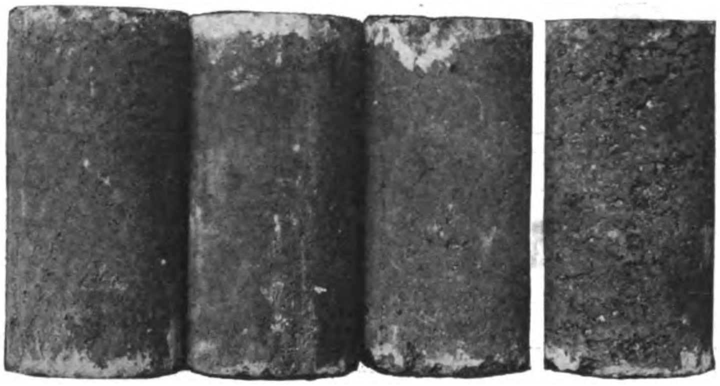

(a) (b) (c) (d)

Fig. 10.—Concrete Specimens After Burning:

(a) Specimen No. 1313—Trap Rock Concrete

(b) Specimen No. 1332—Slag Concrete

(c) Specimen No. 1363—Cinder Concrete, 1:3:6

(d) Specimen No. 1383—Cinder Concrete, 1:0:6

2. To show the amount of protection afforded to larger masses of steel, such as steel columns, and the amount of protection afforded the inner portion of a mass of concrete, such as a column, or of gypsum, such as a floor slab, by the outer portion of the same mass. This is indicated relatively by the temperature distribution through the specimen, at the end of 3½ hours.

Theoretical considerations indicate that the contrasts shown by these results would be greater in the case of actual, large steel members, protected with materials here compared; for it is found that it is the materials of low conductivity, in general, that show the lowest temperatures through the mass of the insulating material. If these materials show the lower temperatures in their own mass at a given time, it is reasonable to assume that the temperature of a steel member under their protection, would not only be at a lower temperature at that time than if under the protection of a material that had itself reached higher temperatures, but also that the steel would continue to receive heat more rapidly through the poorer insulator, until its temperature approached reasonably near to that of the external exposure temperature.

It is found that the length of time required to reach 600 deg. C. at depths of 1½ and 2½ inches does not vary greatly in the clay and concrete specimens. This is not remarkable when it is considered that in materials of high conductivity, heat is more free to pass on to the interior, whereas, in materials of low conductivity it "banks-up" near the exposed surface. It is seen, however, that the denser clays, and the gravel and cinder concretes, make comparatively poor showings in this respect, and that the limestone concretes make a slightly better showing than the other concretes. The gypsums are found to be distinctly better than the clays and concretes in this respect. No comparison is possible among the gypsums in this connection, because only one gypsum specimen in the entire lot reached 600 deg. C. in 3½ hours.

In the matter of the final temperatures through the specimens, the denser clays attained the highest temperatures except those for the poorest cinder concrete. The more porous clays show final temperatures not much different from the average concretes.

Among the concretes the gravel and the cinder con-

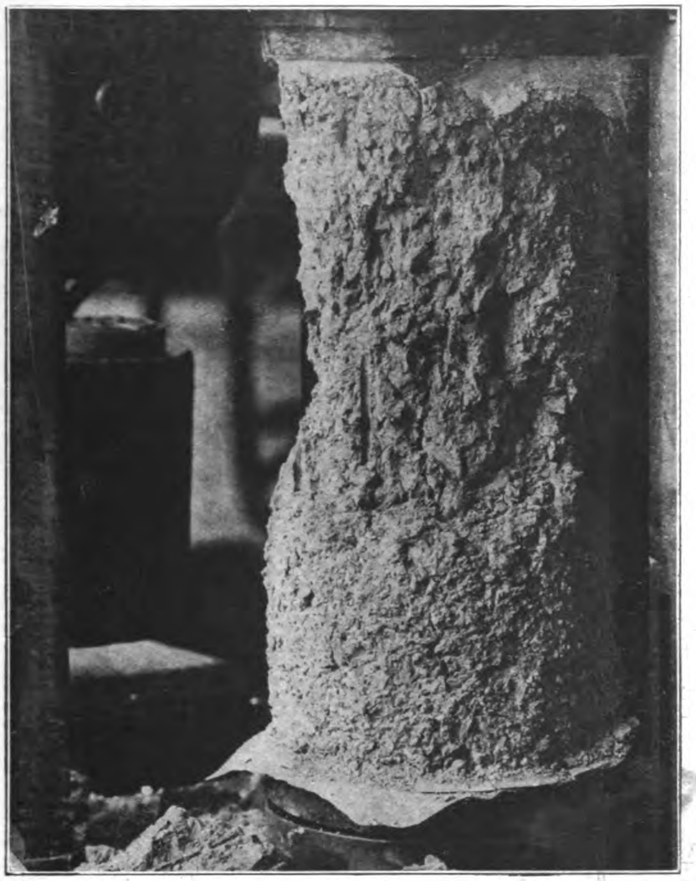


Fig. 11.—
Limestone
Concrete
Specimen
After
Compression
Test

cretes show the highest final temperatures and the limestone concretes the lowest. It should perhaps be pointed out that those concretes termed cinder concretes, had a considerable content of soft coke which presumably contributed to the rapid temperature rise by its own combustion. As for the limestones the calcium carbonate at about 5/16 inch of the thickness of the specimen, next to the cylindrical surface, was decarbonated in each case, which means that about 6 pounds of calcium carbonate were dissociated, giving a loss of weight of approximately 2½ pounds, and requiring approximately as many heat units as the evaporation of 4.8 pounds of water. However, the effect of this heat absorption would not be as great as if it could have been evenly distributed throughout the mass, because heat units would be supplied more rapidly near the surface than farther from it. It is also to be considered that in all probability the thermal conductivity of the material next the surface was lowered by dissociation, calcium oxide being more porous than calcium carbonate. The higher loss in weight from the limestone-concrete specimens, and the higher strength in compression tests, are consistent with the temperatures shown. These findings differ somewhat in regard to the limestone concretes, from the conclusions of Professor Woolson.* Professor Woolson's work was done with comparatively small specimens, 4-inch cubes and 6 by 6 by 14-inch prisms. This would tend to result in a high proportion of the limestone being decarbonated in the tests at the higher temperatures. In his work in 1906, the furnace temperatures did not exceed 815 deg. C. (1,500 deg. F.), at which there would be practically no decarbonation of limestone and consequently no temperature check therefrom. It is also to be noted that part of the results in the 1906 investigation were favorable to limestone as against trap rock.

Among the gypsums there are no wide differences in the temperatures attained by specimens from the different materials and mixtures represented, but there is a fairly consistent tendency for the heavier, denser specimens to show lower final temperatures than the more porous ones. This is presumably due to the fact that the heavier specimens were capable of absorbing more heat, both by dehydration and by the sensible heat taken up in the rise of temperature of the residual material by reason of its greater thermal capacity.

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* "Investigation of the Effect of Heat upon the Crushing Strength and Elastic Properties of Concrete," *Proceedings*, Am. Soc. Test, Mats., Vol. V, p. 335 (1905); also "Investigation of the Thermal Conductivity of Concrete and the Effect of Heat upon Its Strength and Elastic Properties," *ibid.*, Vol. VI, p. 433 (1906).

None of the differences in the temperature showings of the gypsums should be attributed to the different fillers used, because the quantities of material included as filler were apparently very small.

All specimens were examined after test for information on the extent of injury suffered by each. There was no satisfactory comparison possible among the clays, because all were cracked to some extent in kiln burning. There was no spalling in the test.

Among the concretes certain tendencies were apparent. All the gravels were very weak, the 1 : 3 : 6 mixtures somewhat more so than the 1 : 2 : 4, and the specimens in which 15 per cent of cement had been replaced by lime hydrate were still weaker than the others. Cinder and limestone concretes were comparatively sound and strong after test, though this is of course only relative, none of the concretes having much strength. Cinder-concrete specimens Nos. 1291 and 1292 were very weak and friable, due apparently to too great a proportion of fine aggregate. Specimen No. 1291-A was fairly strong. The slag and trap-rock concretes were tender and easily disintegrated by slight shocks or blows. Two of the limestone concretes that had been stored in the damp closet were cracked and weak, apparently due to being too green when tested.

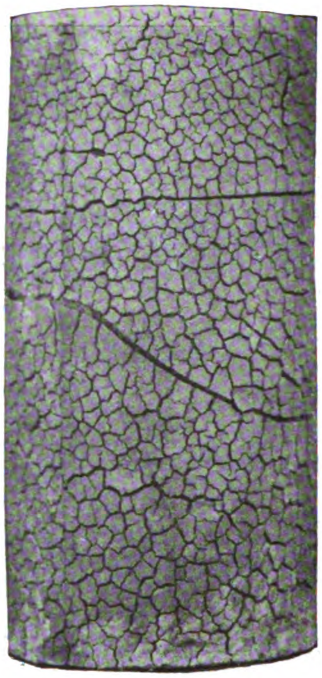


Fig. 12.—Gypsum Specimen After Burning

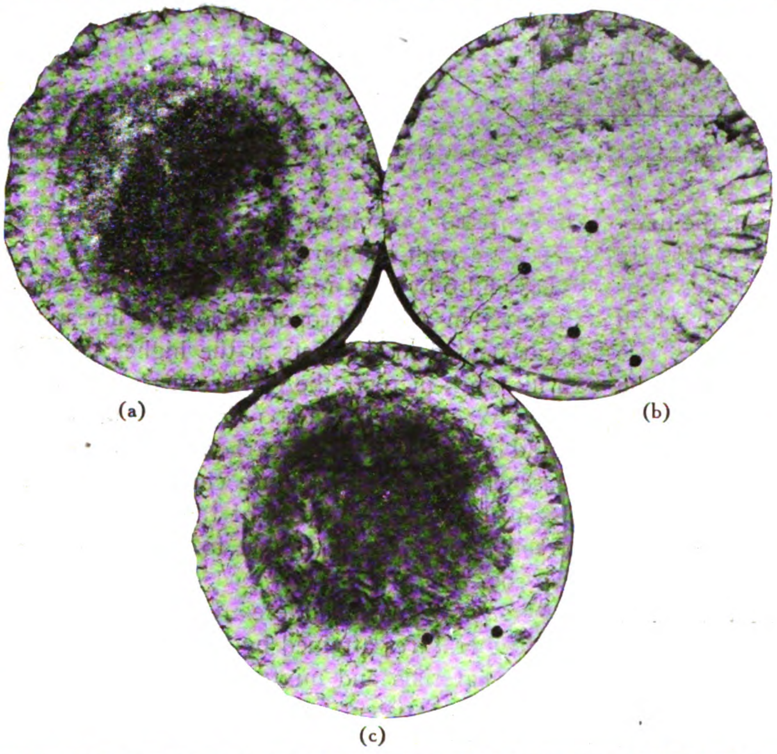


Fig. 13.—Gypsum Specimens After Burning—

(a) With Asbestos Filler

(b) With Cut Excelsior Filler

(c) With Cut Excelsior Filler

All gypsums were weak after test. No consistent tendencies could be discovered excepting that the series which had no filler was perhaps weaker than the others.

Charateristic appearances of burned specimens are shown in Figs. 9 to 14, inclusive. Fig. 11 shows a limestone concrete specimen after the compression test. Specimen No. 1262 was broken in handling.

Conclusions

The tests as a whole indicate that there is not a very great difference among concretes from the aggregates commonly used, in respect to the protection that would

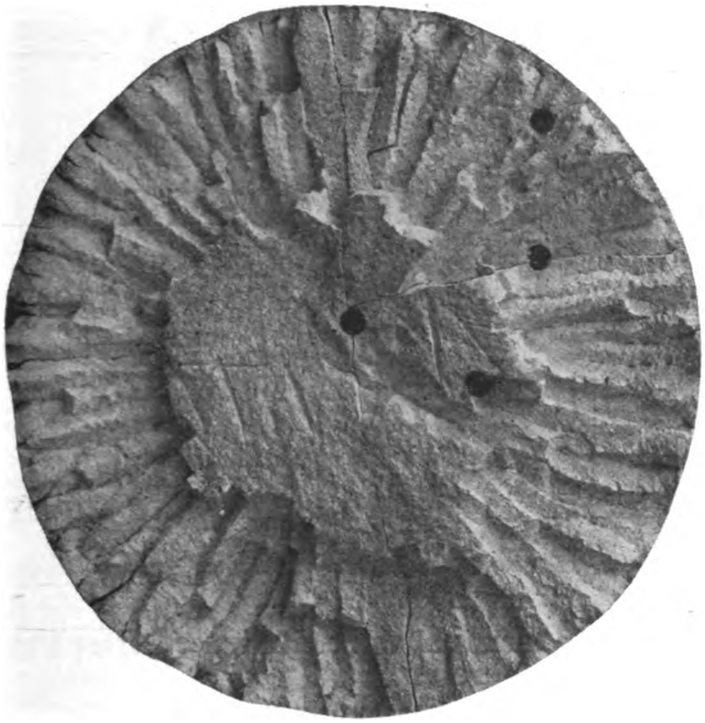


Fig. 14.—
Gypsum
Specimen
After
Burning—
No Filler

be afforded to steel reinforcement embedded in concrete near the surface, assuming that the concrete protection did not come off and expose the reinforcement. It would not be wise to draw conclusions on that point from this work. As to protection of steel members, the insulating properties of the denser clays are indicated to be inferior to the more porous clays and to the concretes. It is to be noted in this connection that this work deals exclusively with solid materials, and it is not attempted to draw comparisons between hollow blocks or tile of one material and a solid mass of another. The more porous clays compared fairly well with the concretes. It should be stated that the porosity of the more porous clay specimens was undoubtedly due in part to lighter burning in the kiln.

Gravel concretes gave particularly unfavorable indications. While the ground covered in this work alone is by far too narrow to permit of drawing hard and fast conclusions, the indications are consistent with the results of both of Professor Woolson's investigations previously referred to, and with information imparted to him by members of the British Fire Prevention Association, as well as with the report made by him on a concrete failure in a recent fire at Far Rockaway, N. Y. Hence, there is strong evidence that some gravels, at any rate, are distinctly inferior for concrete for fire-resistive construction. Cinder concretes are apparently to be viewed with suspicion, especially if the cinders contain much combustible material, which is apt to be the case with cinders from bituminous coal. No anthracite cinders were included in this investigation.

Gypsums made good heat-retarding records, but were very soft and weak after test. There was a favoarble showing made by the denser, as compared with the more porous mixtures, which is consistent with theoretical considerations.

◆

"Watch Your Step!"

IN these days of unusual industrial activity, when new manufacturing plants are being erected almost daily, and those already established are undergoing wide extension, far too little attention is being paid the important matter of safeguarding the employees against death or injury through preventable accidents.

Such an attitude on the part of employers is not only inhuman, but produces an economic waste, regrettable at all times, but absolutely criminal under present conditions when the man-power and the productive wealth of the country—active and potential—should be conserved to the last degree.

Carefully tabulated statistics show that by far the most prolific source of accidents result from slipping and tripping, hence the wisdom of carefully heeding the slogan: "Watch Your Step."

Experience covering a series of years has demonstrated that the most effective means of preventing slipping is to have an abrasive embedded in the walking surface. A material known as "Feralun," pro-

STANDARD FIREPROOFING PRODUCTS.

"MAKE IT CONSISTENTLY FIRESAFE"

"It Costs Less to Prevent Fires Than to Pay Losses"

Two of the necessary maxims in building construction.
And These are Two More:

"MAKE IT CONSISTENTLY SLIPSAFE"

"It Costs Less to Prevent Accidents than to Pay Damages"

The need for slipproof materials is becoming more and more apparent as statistics from various labor departments, coroner's officers, etc., are getting more explicit.

A year ago in Chicago there were only eight people killed in burning buildings, while there were 154 killed by falls on stairs, floors and sidewalks—beside those slipping on ice and banana peels.

Therefore it is most imperative to safeguard surfaces on which people must walk or work.

***FERALUN*—THE LEADING SLIPPROOF TREAD**
IT IS FIREPROOF, TOO
The abrasive is cast in the entire tread surface—will not disintegrate.

Accidents on steps in a large railroad terminal were eliminated after the installation of Feralun.
Anti-slip Efficiency and Durability absolutely proven.

MADE FOR STAIR TREADS AND PLATFORMS, FLOOR PLATES, ELEVATOR AND FIRE-DOOR SADDLES, DRAINAGE GRATINGS, TRENCH, GUTTER, COAL AND MANHOLE COVERS, ETC.

American Abrasive Metals Co.
50 CHURCH ST., NEW YORK

BOOKLET ON REQUEST. ☞ *STEWART BUILDING IS EQUIPPED WITH* FERALUN *TREADS.*

duced by the American Abrasive Metals Company, of New York City, has proven quite effective as an anti-slip surface and has come into use for many forms of tread surfaces where great durability and certain effectiveness against slipping is desired. It is made of metal with an abrasive grit embodied in the wearing surface and is not slippery even when covered with oil. It remains effective for a long time, lasting five to eight years on the New York Subway stairs. In some places, as in charging floors of gas-generating plants, where there is almost constant heavy trucking, it shows practically no signs of wear after four years' service. The use of some such material as "Feralun," instead of the usual cast iron and steel floor inserts and stair treads, practically eliminates the most vicious types of slipping hazards.

Face-Brick Men Awake to Opportunity

A DETERMINED effort is being put forth by the American Face Brick Association to secure substantial support from a large percentage of the face brick manufacturers of the country to its three-year publicity plan. The campaign centers around a provisional contract which does not become effective unless an arbitrary minimum, closely approximating 85 per cent of the production, supports the movement. In the event of securing such overwhelming endorsement, it is the purpose of the Association to conduct a broad campaign in the interest of its product among architects, engineers, contractors, material dealers, prospective builders, trade and technical schools, etc. Specific details as to plans cannot be made public until the necessary support has been assured.

Proposed Grain Elevator for Portland, Ore.

TO maintain the supremacy of Portland, Ore., as the grain export center upon the Pacific Coast, citizens of the community some months ago decided upon a bond issue of $3,000,000, the proceeds to be used in the construction of additional elevator and port facilities for handling grain in bulk and other freight.

An elevator of 1,000,000 bushels capacity will be built as a first unit, with space and connections arranged to increase the bin storage to 2,000,000 bushels when the need arises. The working house will be planned for the larger capacity storage.

The elevator will be a combined bulk and sack elevator, to enable grain to be shipped by either method. It will be a modern, fireproof, reinforced concrete structure, costing approximately $900,000 for the first unit.

A Department Devoted to the Use of

AUTOMATIC SPRINKLERS

Edited
IRA G. HOAGLAND, Secretary **PAUL MASON, Special Representative**
National Automatic Sprinkler Association

Safeguarding Food Supplies From Fire

DESIGN and equipment of buildings to resist and control fire is not only a practical necessity, but also a wartime necessity and, above all, a patriotic duty. It is an economic necessity at all times; but in the peaceful past, when there was apparent plenitude of everything, even at constantly higher prices, this necessity was persistently ignored, and little was accomplished. Now, however, the shock of war has brought understanding. The eyes and the ears of a neglectful and wasteful people have been opened, so that they see and hear; and with seeing and hearing has come comprehension that conservation of food products, of the products of mechanic industry, of the industries themselves, is a broad and deep problem, the solution of which must be achieved through fundamentals and not through incidentals.

There must be saving, but not skimping; economy, but not parsimony; but, above all, conditions favorable to conservation must be created. Among the prime essentials of these favoring conditions must be the safeguarding of industrial establishments from fire, by sound construction, embodying design, materials and methods; the enforcement of care, cleanliness and vigilance in the prevention of fire; and proper equipment to contol fire in event of its development.

What the Country is Wasting

Magnitude of the wastage and the vital need of the hour for its diminution are seen in the figures of the four months ended August 31, covering fire losses in the principal groups of food handlers. The record indicates an increasing burning ratio that bids fair to carry the year's losses, in these groups alone, above $25,000,000.

The general fire record is no less appalling. Losses the first eight months of the year, at $180,500,000, were just about equal to losses during 1915 in entirety, and were nearly $22,000,000 larger than for the corresponding months of 1916. August losses were nearly $22,000,000. This means that if the present ratio of increase continues, this year's losses will approximate $270,000,000.

In food supplies, the record for May, June and July showed destruction of 11 grain mills, 16 elevators, 35 food warehouses of various kinds, including slaughter houses and packing plants; and four bakeries, with losses aggregating $5,642,000, or an average of $1,881,000 a month.

The August record included three mills, six elevatos and 26 miscellaneous food establishments, with losses aggregating about $2,071,000. This is a marked increase over the average of the preceding three months, and brings the average for a third of the year up to $1,928,000—far too much to be taken away from the Nation's food supply month by month.

As a large proportion of this loss can be eliminated—at least in the future—by correct design, proper construction and adequate protective equipment of buildings, its continuance must be regarded as criminal folly. The corrective is in the hands of the architects and builders. The method is known; it needs only to be applied.

As the National Board Sees It

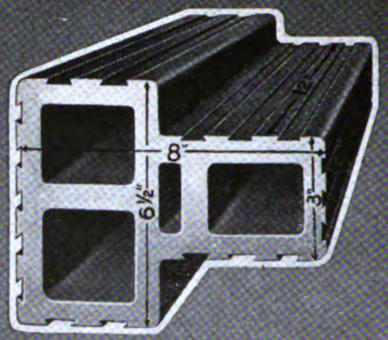
The National Board of Fire Underwriters, incidental to recent surveys of American industries, including food handlers, has issued two pamphlets, "Safeguarding Industry" and "Safeguarding Grain Elevators." They embody common-sense rules for remedying conditions favoring the inception and spread of fire. There are six of these conditions:

(1) Disorder; (2) Ignorance and Carelessness; (3) Defective Equipment; (4) Faulty Construction; (5) Insufficient Protection; (6) Lack of Defense.

Conditions 3, 4 and 5 are clearly up to the designers of buildings. Though only half of the total, they include many more factors of safety than the others. The potential power of architects to create conditions favorable to conservation, therefore, is clearly apparent.

Famous Users

These famous business organizations, the most critical buyers in the world, have investigated and approved Denison Interlocking Tile for their own building walls. Isn't it worth your while to find out why?



This unit builds all desirable thicknesses of wall. See drawing below.

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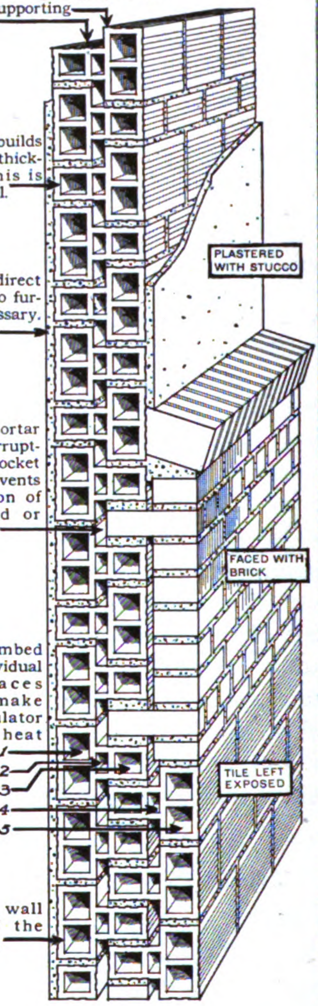
Carnation MILK
OTIS ELEVATOR
CALIFORNIA'S Sunkist
WINCHESTER
Skookum

THE CLAY PRODUCTS CO.

Lemcke Annex
Indianapolis, Ind.

175 W. Jackson Blvd.
Chicago, Ill.



Partitions always directly over each other — giving greatest possible supporting strength.

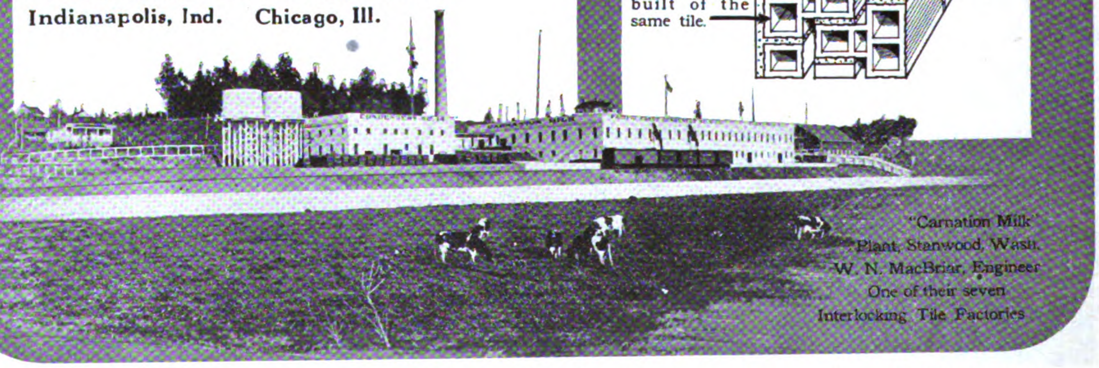
Same tile builds walls any thickness. This is 8-inch wall.

Plaster direct on tile—no furring necessary.

Every mortar joint interrupted by air pocket which prevents conduction of heat, cold or moisture.

Honeycombed with individual air spaces which make best insulator against heat and cold.

12-inch wall built of the same tile.



"Carnation Milk" Plant, Stanwood, Wash. W. N. MacBriar, Engineer One of their seven Interlocking Tile Factories

Licensed under the patents of the Denison Interlocking Tile Corporation, 518 Guardian Bldg., Cleveland, Ohio

The most vital condition concerns the control of fire. On this point "Safeguarding Industry" says:

"Common-sense will tell you that almost all fires have small beginnings, from which arises the old saying that the first five minutes in fighting a fire is worth more than the next five hours. This means that your means of extinguishing should be immediately accessible; in other words, that such means should be distributed throughout your premises so that at no point will they be far away. The most valuable of all devices for this purpose is the automatic sprinkler, which is too familiar to need description. It provides an immediate downpour of water at the exact place of the blaze, and generally extinguishes such a blaze at once. Insurance companies recognize this protection by making a large reduction in rates wherever buildings are well equipped with sprinklers."

Practical Way to Reduce Loss

Among "Practical Suggestions for Reducing Fire Loss," from the same pamphlet, is this:

"When properly installed, with an abundant and constant water supply at proper pressure, and the equipment maintained in a constantly operative condition, the automatic sprinkler has proven itself the most reliable and satisfactory fire-extinguishing device in use, being suitable for effective service in practically every class of structure and under nearly any condition of fire hazard arising from causes incident to occupancy or processes. It is therefore urged that such protection be installed in every structure where the nature of the occupancy is not such as to render these devices inoperative or ineffective."

Dealing specifically with grain elevators, the second pamphlet issued by the National Board declares:

"Where properly installed and maintained, automatic sprinklers have rendered valuable fire service, and their installation is worthy of serious consideration."

Protective equipment should be designed with the building, and should be specified by the designer. This applies with especial force to higher types of protection, such as automatic sprinklers, standpipe systems, etc., which are just as much a part of the building as fire doors and shutters, wireglass windows and enclosures, wall safes and cabinets for protection of records, metal lockers, etc. The architect should insist on them for new buildings and urge their installation in existing buildings undergoing enlargement, improvement or repair.

Owners and occupants of such buildings need them for their own safety and prosperity, and a burden of patriotic duty rests on them to utilize their protection for the safeguarding of the Nation.

For the necessity, already great, is growing with the increasing menace.

For Greater Fire Safety in Public Schools

UNDER direction of the Minneapolis, Minn., Civic and Commercial Association, its Committee on Municipal Research made a careful analysis of the Five-Year Building Program of the Board of Education of the home city.

In considering the educational needs and the facilities proposed by the Board of Education for meeting them the Committee on Research paid close attention to the fire safety of the school buildings—both those in use and contemplated.

Holding that the use of "wire glass, boiler-room windows, metal window frames" and automatic sprinklers were "immediately needed to reduce fire hazards," the committee endorsed their suggested purchase unqualifiedly.

It was figured that a sprinkler system could be installed in each of the schools at an average cost of $2,500 per building.

Too great care in protecting school children against fire and its attendant danger—panic—cannot be exerised, and the authorities of Minneapolis are to be commended for their appreciation of this fact.

National Service Work of Underwriters

A HIGH measure of praise is due the National Board of Fire Underwriters for the systematic and valuable service it is rendering the Federal Government in these strenuous times in safeguarding the depots in which food and war supplies are stored against loss or damage through fire.

Trained engineers are freely assigned to the work by the National Board, which bears the entire cost of such work.

In co-operation with the Food Administration the underwriters are preparing for the United States Grain Corporation lists of all country grain elevators in the United States, which data will be highly useful to the officials in granting grain purchase permits.

The National Board has further tendered the services of its skilled force of fire protectionists to the Emergency Fleet Corporation of the United States Shipping Board for work similar to that rendered the War and other branches of the Government and is working in season and out to do "its bit" in helping Uncle Sam by guarding against the destruction of valuable supplies by fire.

Barrett Specification Roofs

Guaranteed for 20 years

Barrett Specification Roof on GROVES MILLS, INC., GASTONIA, N. CAROLINA. *Architects:* Mayes Engineering Co., Charlotte, N. C.—*General Contractor:* J. D. Grandy, Charlotte, N.C.—*Roofing Contractors:* A. Y. Bond, Inc., Greensboro, N. C.

Free Roof Insurance for 20 Years

You are proud of that new plant—proud of its modern construction, its efficiency, its output. It represents a big investment of money and enterprise.

Of course it is insured against fire. But how about the roof? Is your investment there insured?

If you cover your building with a Barrett Specification Roof you will get such insurance in the shape of a 20-Year Surety Bond.

Our experience has proved that a roof laid strictly according to The Barrett Specification will last much longer than twenty years without repairs of any kind, and our new plan of issuing the 20-Year Surety Bond Guaranty gives owners the benefit of that experience.

Here is our offer:

On all roofs of fifty squares or more, in all towns of 25,000 or more throughout the United States and Canada, and in smaller towns where our Inspection Service is available, we will give a 20-Year Surety Bond Guaranty, provided the roof be laid strictly according to The Barrett Specification of May 1, 1916, and by a roofer approved by us.

This bond exempts the owner from all expenses of maintenance and repairs for a period of twenty years.

We claim only the right to have an inspector on the roof during construction to insure strict compliance with the Specification.

The risk is ours, the gain is yours.

Leading architects, engineers and roofing contractors throughout the country are familiar with and endorse our plan.

A line to our nearest office will bring any information you may desire concerning this proposition.

Barrett Specification Roof

20 Year Guaranty Bond

A copy of The Barrett 20-Year Specification, with roofing diagrams, sent free on request.

The Barrett Company

Largest Manufacturers in the World of Roofing and Roofing Materials

New York Chicago Philadelphia Boston St. Louis Cleveland Cincinnati Pittsburgh
Detroit Birmingham Kansas City Minneapolis Nashville Salt Lake City Seattle Peoria
THE PATERSON MANUFACTURING COMPANY, Limited: Montreal Toronto
St. John, N. B. Halifax, N. S. Sydney, N. S. Winnipeg Vancouver

TRADE B MARK

SAFE HOMES

Edited by **RALPH P. STODDARD, Secretary**
Society Advocating Fire Elimination

Another Convert to Masonry Construction

A TILE and stucco bungalow with a slate roof, selling complete for $3,650, is a strong argument in way of firesafe building as against the dangerous kind.

The little bungalow illustrated on this page is the type of house that is being built by the O. G. Deming Company in Cleveland. Mr. Deming has for many years been a builder of homes upon a large scale in what is known as the Hayden avenue section of Cleveland, just north of Euclid avenue. Mr. Deming has opened a score of streets and has built hundreds of houses. Until the present year nearly all of his operations were in frame. Mr. Deming became an S-A-F-E convert in the present season, and in opening a new property in which bungalows predominated he was prevailed upon to try the firesafe type. Mr. Deming selected the tile stucco as suiting the needs of that community and the one completed shown in the illustration is the first in the new property. This house has a comfortable living room, dining room, kitchen, two bedrooms and bath. There is a basement under the entire building, which is equipped with a hot-air furnace. There are front and rear porches and good plumbing fixtures and electric fixtures throughout. All the interior walls are of gypsum plaster board instead of wood, lath and plaster, thereby adding to the fire-resisting qualities of the house. The exterior stucco is two-coat work, furnished in rough cast upon 8-inch hollow clay tile. It makes a very neat and attractive little home, comfortable all the year around and economical to maintain.

Mr. Deming was so well pleased with the cost upon building this first bungalow that he has adopted this type for his street building in this particular addition. Here is what Mr. Deming has to say of value to the real estate operator of good grade of construction:

"On account of some of the rather cheap construction that was going up on property adjoining mine," said Mr. Deming, "I felt that it was becoming difficult for me to make loans on many of my operations."

" 'The quality is going down out your way,' said my banker to me. 'You must do something to pull up the grade if you expect us to back you.' "

"This further encouraged me to go into the firesafe type of house," is Deming's statement, "and in addition to the street of stucco bungalows I am planning to erect a number of tile and brick houses on the streets at the boundary of my new property; thus I will cut off the inferior construction beyond me, and I have already succeeded in putting my own property on a basis that commands the usual percentage of loan for construction work."

As has been stated, Mr. Deming is selling the stucco bungalow with the lot for $3,650. Frame bungalows of the same size and similar locations are selling for practically the same amount, and in no case for less than $3,100. The first difference in the quality of these houses seems to overcome the difference in price with the buyer, and Mr. Deming is finding a lively demand for this type.

Select a Reliable Contractor

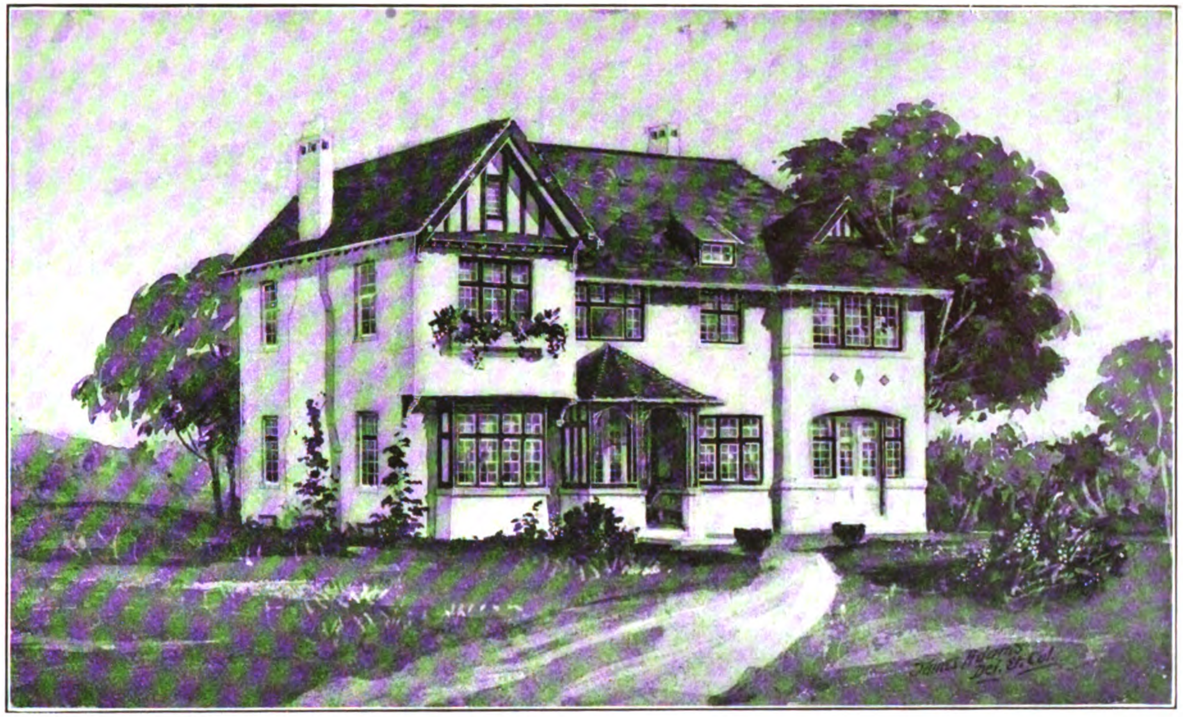
EQUALLY as important as the securing of a capable architect preliminary to home building is the selection of a reliable contractor—one who will not merely follow plans and specifications according to their letter, but who will take a real pride in his work and throw into it that indefinable something that clearly shows in the final result.

Rarely will a contractor of the desirable type prove to be the lowest bidder for a job; as a matter of fact, he will usually be the highest for painstaking work, and carefully selected building material must be paid

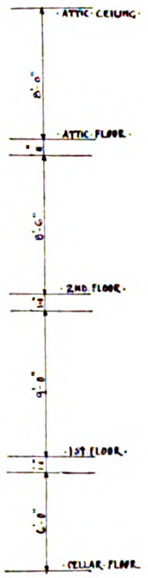
(*Continued on page 127*)

·A·FIRE-SAFE·HOME·

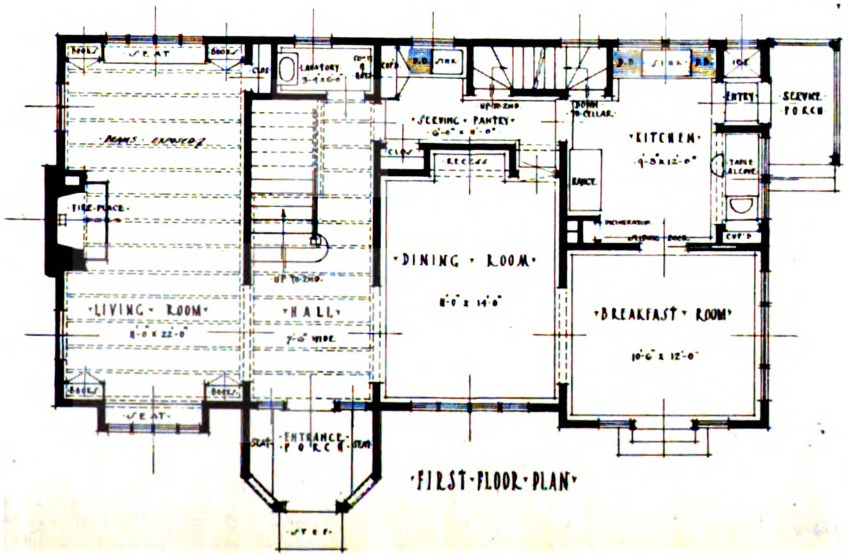
·DESIGNED·BY·
·ADAMS & McCLUSKEY·
·ARCHITECTS·
·NEW·HAVEN·CONN·



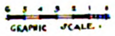
·PERSPECTIVE·

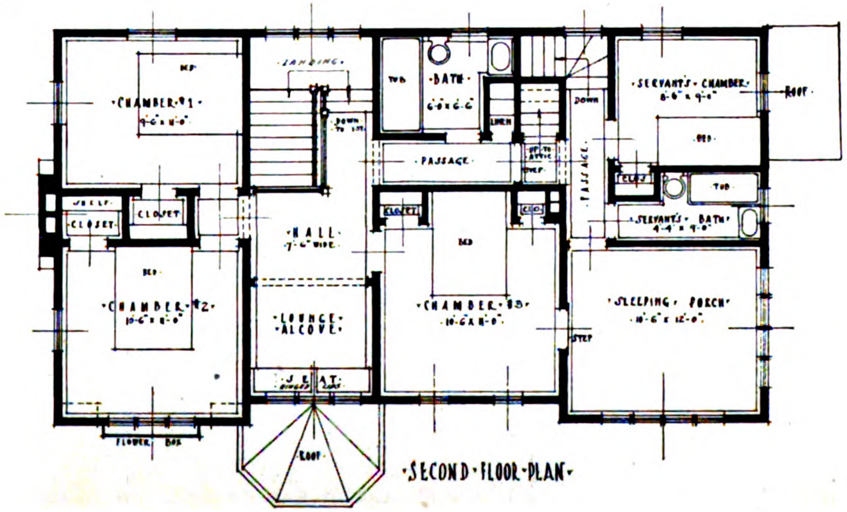


·STORY·HEIGHTS·



·FIRST·FLOOR·PLAN·





·SECOND·FLOOR·PLAN·

Attractive Home for Suburban Centers

THE design shown upon the opposite page is intended for the suburban towns of the Eastern States, though with modification it may be built to advantage anywhere throughout the country.

There is to be a cellar under the entire house with a 7 feet 6 inches story; first story, 9 feet; second story, 8 feet 6 inches; attic, 8 feet clear.

The exterior walls to be of concrete, hollow tile or frame construction covered with metal lath and stucco.

The roof covered with tile, slate, asbestos cement, asphalt or metal shingles, color tile red.

The exterior woodwork stained a rich brown. The sashes and doors painted white.

Interior partitions of hollow tile or gypsum tile plastered thereon. The interior trim of cypress, stained and painted.

The floors may be of concrete, using metal lumber and lath or steel tile instead of the usual wood floor construction; the finish flooring being fastened to sleepers imbedded in the concrete.

The principal living room to face the south, with a vista through from east to west. The breakfast room on east side, constructed conservatory type, with plenty of room for plants, making a pleasant feature. Over this is planned a sleeping porch, having liberal openings with movable glazed sashes for winter and open metal screens for summer use.

A convenient economic plan with easy and convenient service and maid's accommodation entirely separated on both floors. Two rooms in attic. An efficiency kitchen, planned to save many footsteps in "kitchen service."

House heated by steam or hot water, with boiler in cellar. Lighted by electric and gas system. Gas water heater in cellar.

Cost would not exceed $8,500 for erection in the Eastern States, including excavation, carpenter, painting, plumbing, heating and lighting.

Selecting a Reliable Contractor

(*Continued from page* 125)

for; but they are worth it. Eventually the well built house will prove cheaper than the hastily erected structure put up by the "lowest bidder," and it will always present a more satisfying appearance.

Apropos of this matter the subjoined quotation from the house organ of the Knickerbocker Portland Cement Company is interesting

"The law had to be invoked to settle a muddle that should have been prevented. A contractor secured the privilege of erecting a house because his bid of $4,640 was the lowest. The architect stated that the structure could hardly be erected for less than $7,000, but the circumstance were such that he was compelled to award the job to the man with the suspiciously low estimate.

"It was held by the court that the contract was valid, regardless of the loss the contractor seemed knowingly to invite by his 'subcellar figure.'

"But the time will come, ere long, when a contractor of this reckless type needs investigation; for his bid is demoralizing the whole local industry.

"He cannot honestly make good on it, unless he is in business from philanthropic motives, or determined to die poor, like Mr. Carnegie.

"Of course, his intentions may be like those of the silverware manufacturer who was told by a customer to lower the price on silver spoons even if it were necessary to put in a lot of lead.

"In placing the second order, the customer said: 'Put in still more lead and make the price still lower.'

"The manufacturer replied: 'No; I can't. The previous shipment of silver spoons was all lead.'

"The spirit of the age is tending more and more away from individual responsibility toward group responsibility. The contractor who cheapens his reputation damages the reputation of the contracting profession as a whole."

New Plastic Composition

ROBERT YOUNG ARDAGH, of Hove, Eng., says the *American Roofer,* has invented a fire-resisting composition for boards, sheets and flooring blocks, and as a covering to materials in use for walling, roofing and flooring various building constructions; its practical utility being to reinforce and make such materials fire-resisting, and to produce commodities in the shape of boards and sheets for paneling and flooring blocks which can be used as fire-resisting building materials.

The ingredients of this composition are cocoanut shell or cocoanut fiber, pulverized calcined magnesite and chloride of magnesia.

The process of manufacturing this composition consists in grinding cocoanut shell in a disintegrator or mill, preferably to about the size of coarse oatmeal. The short fiber is passed through a fine sieve to insure uniformity.

Like cement concrete, the proportionate quantities of shell and fiber to magnesite are varied and range according to the thickness and nature of the covering required; speaking generally, about equal bulk of magnesite to shell is a good mixture, and if a lighter color is required a richer mixture of magnesite can be applied to the top surface with a brush after the manner of varnishing.

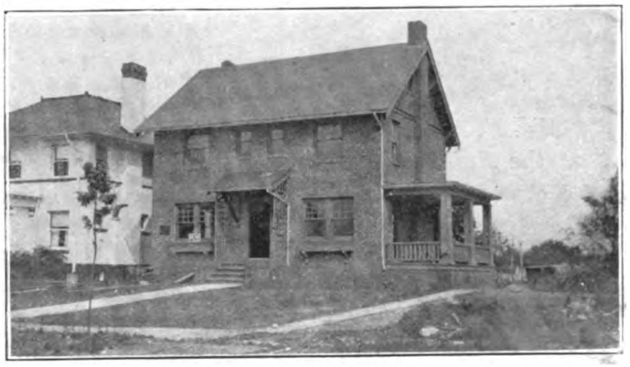
This plastic composition readily adheres to many materials, and by its application as a fire-resisting covering their sphere of usefulness is considerably enhanced by the combination for walling, roofing and flooring in various building constructions.

A Prize-Winning Design

THE brick Colonial shown on this page is adopted from the plan of Robt. Tappan, 33 West Forty-second street, New York City, that won the first prize in the architectural competition at the Grand Central Palace last March.

Mr. Tappan's house attracted wide attention through the publication of book plans by the Complete Building Show Company, Cleveland, which put on the show at the Grand Central Palace and conducted the competition.

The Brick Homes Company, of Cleveland, Andrew Pentland, supervising architect, designed this house for brick construction, and it has just been completed on Essex road, Cleveland Heights. This house, upon a large lot in one of the exclusive residence sections in the city, is selling for $8,500 complete. A center hall, large living room with cobble mantel, dining room and kitchen on the ground floor. There are four bedrooms and a bath on the second floor and two rooms on the third floor. The structural material of the house is hollow clay, tile faced with red brick. The open porch is connected with the living room by two Fench doors.



This is the first venture of the Brick Homes Company in houses costing above $5,500. The company was formed two years ago to demonstrate that the low-priced home for the average man could be constructed of firesafe materials at a cost within reasonable range. It has built houses of both brick and stucco, employing tile, metal lath, stucco and tile brick, and all the various types of firesafe house. It has been erecting these small residences in various sections of the city and they have always found a ready sale with prices but slightly in advance of frame construction of similar size. The success of this company has led to the organization of other similar building companies in Cleveland specializing in firesafe construction.

The movement, moreover, is destined to spread to other centers if the interest manifested by real estate dealers and investors in the activities of Cleveland are a reliable criterion. Each added building of the firesafe type is a distinct gain in comfort and fire loss reduction.

Joins Ohio Builders' Supply Association

THE office of the Ohio Builders' Supply Association has been moved from Columbus to Cleveland and occupies the suite in the Leader-News Building, with the office of the Society Advocating Fire Elimination and the Cleveland Supply Dealers' Board. This change was made necessary by the appointment of Ralph P. Stoddard as assistant to the president of the State Association to succeed H. S. Gaines, who has resigned to take a position in the East. Stoddard is to continue as the active secretary of the S-A-F-E and of the Cleveland Supply Dealers' Board subsidiary to it, and he will have as an assistant in both the State and the local work Charles T. Harris, recently director of the Hollow Tile Bureau and formerly secretary of the National Hollow Building Tile Association.

The Ohio Builders' Supply Association was reorganized a little more than one year ago, with Mr. Gaines as assistant to the president. Mr. Gaines has built up the membership to about 600, which is contained in thirty district organizations throughout the State. The Ohio organization at the present time is looked up by supply men throughout the country as the most successful association in the trade. Mr. Gaines left the work to take an important position with an Eastern association.

The executive committee through agreement with the directors of the Cleveland Supply Dealers' Board arranged to have the State work taken over by Stoddard.

The present officers are: W. O. Holst, president, Toledo; F. H. Kinney, secretary, Cincinnati; J. W. Thomson, treasurer, Coshocton.

A joint local meeting of the Supply Dealers' Board and a State meeting which was attended by representatives of each of the thirty districts of the Ohio organization was held at Cleveland on October 4.

For Advancement of Clay Products

The Clay Products Bureau is a new organization of San Francisco. Formed by representatives of the leading brick and pottery manufacturers upon the Pacific Coast, it will center its energies upon advancing the interests of clay products, and by so doing promote the cause of better building as well.

Homes of Masonry
Construction Insure
Lasting Satisfaction

WEATHER:
Always warm in winter and cool in summer if you are in a firesafe home, office or factory building.

The Fireproofing News

CONTAINING DETAILED DESCRIPTIONS OF NEW DEVICES AND APPLICATIONS OF MATERIALS WHICH ARE OF REAL VALUE IN FIRESAFE BUILDING: ALSO NOTES ON THE LATEST BOOKLETS, CATALOGS AND OTHER FIRESAFE LITERATURE, WITH OTHER ITEMS OF INTEREST TO THE FIREPROOFING FRATERNITY

LATEST EDITION

Copyright by Constrvction Publishing Co., of New York, N. Y., 1916

New York City, N. Y., September, 1917

Priceless

CENTURY-OLD SLATE ROOFS

In Bradford-on-Avon, Eng., according to "Stone," stands an old Saxon chapel, which was built in the eighth century. The builders covered it with a slate roof. There the church stands to-day, still protected by the same slate, moss-covered, but good, says a Cleveland newspaper. Year after year this slate roof has defended Saxon chapel from the successive assaults of rain, hail, snow, wind, sun and frost. Twelve centuries it has served. It complains not, and it has no misgivings about the future—it is a slate roof.

The British Isles, in particular, are rich in evidence of the long life of slate as a roof covering. Slate was quarried in Wales centuries before America was discovered. There is in England to-day a slate roof over three hundred years old, and still in good condition, covering a house that originally sheltered one of the ancestors of a Cleveland man engaged in the slate-roofing business.

The first recorded use of slate in America was on a building in Philadelphia erected in the year 1700, which building served as the seat of government for William Penn's domain.

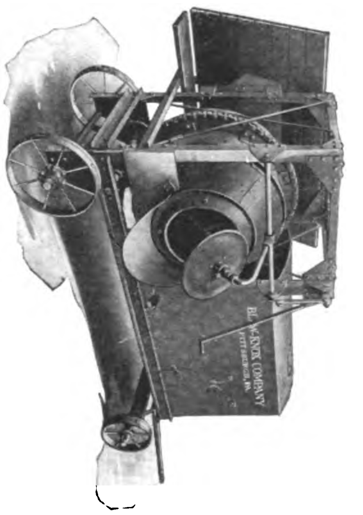
◆

THE "BLAW-RANSOMIXER"

A "contribution to the economy of concrete construction work" will result through the use of the new "Blaw-Ransomixer," according to the claims of its manufacturers, the Blaw-Knox Company, of Pittsburgh.

The advantages of the machine, to quote its inventors, A. V. Ransome, are as follows:

Horse-power, low charge type 4; power loader 6; drive, No. 520, roller type chain, steel side bars and rollers. Case-hardened pins and bushings, 16,500 pounds ultimate strength; main drive socket; cast in segments and fastened to angle lugs riveted to center of the drum. Frame, steel, with sills of 4-inch by 6½-pound channels, strongly braced. Dow frame of 3x3x3/16-inch angles, gusseted in both directions and cross braced by adjustable tie rods. Rollers, solid web and hub, running loose on 1¾-inch shaft. Gear-shell, welded and then turned. Set back 12 inches from face. These rings, turned at one setting, are parallel and concentric—capacity: full 10 cubic feet, without spill or slop. Quick-mixing action, due to practically straight blades. Conical heads carry material away from feed openings as fast as fed. Clean-up qualities; drum heads form with shell a wide angle 135 at point of juncture. The blades are straight and undercut in the direction of revolution, and are so set that the discharge from one glade falls on the back of the following blade, thus setting up a scouring action which will keep the mixer clean.



◆

The capital of the National Clay Refining Company, of Philadelphia, has been increased from $75,000 to $112,500.

APPROVED BY THE UNDERWRITERS

The H. F. Watson Company, Erie, Pa., has received from the Underwriters' Laboratories the standard—Class A—rating for fire service on a built-up asbestos-asphalt roof covering of the 3-ply pattern; the same rating on asbestos-asphalt prepared roof covering, 4-ply pattern; the standard—Class B—for fire service on a built-up roof covering assembled according to definite specifications, the same rating on asbestos-asphalt prepared roof covering in 2, 3 and 4-ply patterns.

The Certain-teed Products Corporation, St. Louis, Mo., has received the standard—Class C—rating for fire service on an asphalt-rag-felt prepared roof covering.

The Elaborated Ready Roofing Company, Chicago, is given the standard—Class C—rating for fire service on asphalt-rag-felt prepared roof coverings. The same rating is given to an asphalt-rag-felt prepared roof covering made by the Texas Company of Houston, Tex.

The National Fire Protection Association, 87 Milk street, Boston, Mass., is given the standard—Class A—rating on the N. F. P. A. Specification tin roof coverings.—*American Roofer.*

◆

An order for 100 carloads of red hollow building tile has been secured from the Federal Government by the Bradford Pressed Brick Company of Bradford, Pa.

◆

The plant of the Nansemond River Brick and Tile Company, of Suffolk, Va., has been taken over by the lately-formed Nansemond Brick Company of the same place. The new corporation has a capital of $100,000.

Residence of M. Trempler, Detroit, Mich.

Yes—

have an artistic roof — but add a Safety Clause—*fireproof*

AFTER all, it is a roof you are building and a roof has many responsibilities that all fall on the material you choose. Bad weather and changes of temperature bring repair bills and painting costs. Sparks from your chimney, or someone's burning house, may bring disaster.

So you must go further with the decision than to say just "fire-repellent shingles," because the fire-repellent shingles can burn. The FIRE-PROOF Shingle—Johns-Manville Transite ASBESTOS Shingle—will not. Add up all the requirements and put all the emphasis your mind can summon on the thought of fire safety. And you'll insist on Johns-Manville Transite Asbestos Shingles. You can have all the choice of shape and color, any style of laying—all the roof beauty you please without the expense of the tile roofing or the weightiness of slate. Like all other Johns-Manville Asbestos Roofings these shingles are backed by

Johns-Manville Roofing Responsibility

Under this policy your roof can be registered on the roofing records of this company. It is, then, our obligation to see that your roofing in service is all that was promised when it was purchased.

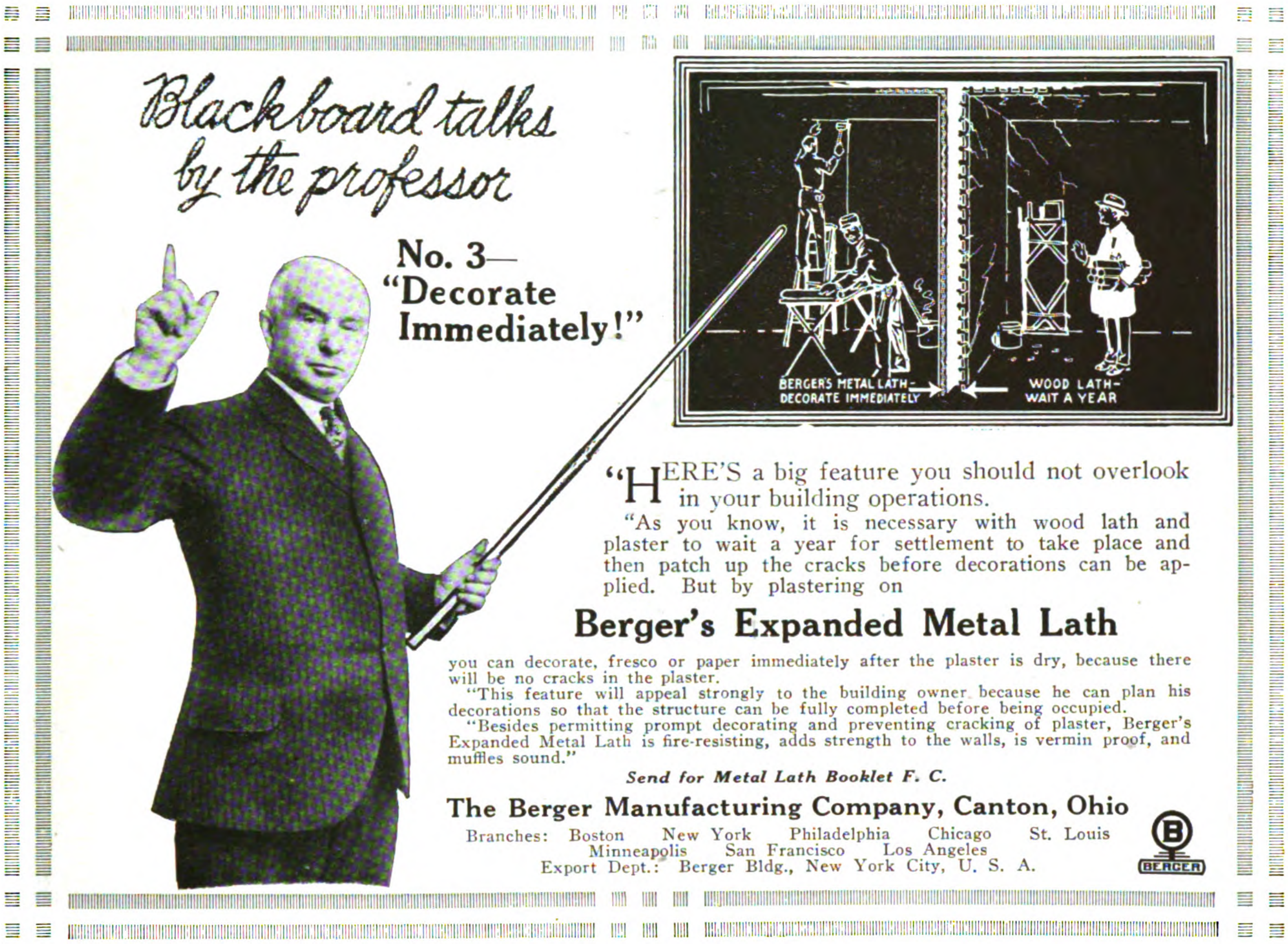
Johns-Manville Transite Asbestos Shingles are examined, approved, and labeled by the Underwriters' Laboratories, Inc., under the direction of the National Board of Fire Underwriters.

JOHNS-MANVILLE SERVICE COVERS THE CON

Here's a booklet on Shingles. It is sent free. It is full of worth-while facts on Shingle Roofs—tell us where to send it.

H. W. Johns-Manville Co.
New York City
10 Factories
Branches in 54 Large Cities

JOHNS-MANVILLE *Transite* ASBESTOS SHINGLES



Blackboard talks by the professor

No. 3—
"Decorate Immediately!"

"HERE'S a big feature you should not overlook in your building operations.

"As you know, it is necessary with wood lath and plaster to wait a year for settlement to take place and then patch up the cracks before decorations can be applied. But by plastering on

Berger's Expanded Metal Lath

you can decorate, fresco or paper immediately after the plaster is dry, because there will be no cracks in the plaster.

"This feature will appeal strongly to the building owner because he can plan his decorations so that the structure can be fully completed before being occupied.

"Besides permitting prompt decorating and preventing cracking of plaster, Berger's Expanded Metal Lath is fire-resisting, adds strength to the walls, is vermin proof, and muffles sound."

Send for Metal Lath Booklet F. C.

The Berger Manufacturing Company, Canton, Ohio

Branches: Boston New York Philadelphia Chicago St. Louis
Minneapolis San Francisco Los Angeles
Export Dept.: Berger Bldg., New York City, U. S. A.

BERGER

ADDS TO NUMBER OF ITS PLANTS

A valuable addition to its already numerous properties has been secured by the Kelley Island Lime and Transport Company of Cleveland, Ohio, through the purchase of the Dutchess County Lime Company of Dover Plains, N. Y. This move has secured to the Kelley company its fourteenth plant; its other properties being located at White Rock, Marblehead, Kellys Island, Sandusky, Fostoria, Genoa, Gibsonburg, Tiffin, Marion and Luckney, Ohio; Huntington, Ind.; Martinsburg, W. Va., and Buffalo, N. Y.

◆

RECORD CONCRETE STACK

What is reputed to be the largest concrete smokestack ever built in this country has recently been completed for the Falls Manufacturing Company, paper and pulp manufacturers at Oconto Falls, Wis. Rising 225 feet above the surface of the ground, the stack's base rests upon solid rock. It is anchored by 45 steel rods, drifted diagonally into the rock for 10 feet, and extending upward into the cylinder from 18 to 20 feet.

◆

JOIN HYDRATED LINE BUREAU

Tyrrell B. Shertzer and C. W. Freitag have joined the engineering staff of the Hydrated Lime Bureau, of Pittsburgh, the former as Eastern District Engineer, with headquarters at New York, and Mr. Freitag as Western District Engineer, with headquarters at Pittsburgh.

◆

To manufacture brick and other building material, the Baltic Clay Products Company has been formed at Baltic, Ohio, with a capital of $50,000.

◆

Through the office of the Jenkins Brick Company, of Montgomery, Ala., Denison interlocking tile will be manufactured and sold throughout the South. The immediate output of the Jenkins Company will be 50,000 tiles per week, which figures will in all likelihood be increased later.

◆

HOLLOW METAL TRIM TO BE INSTALLED

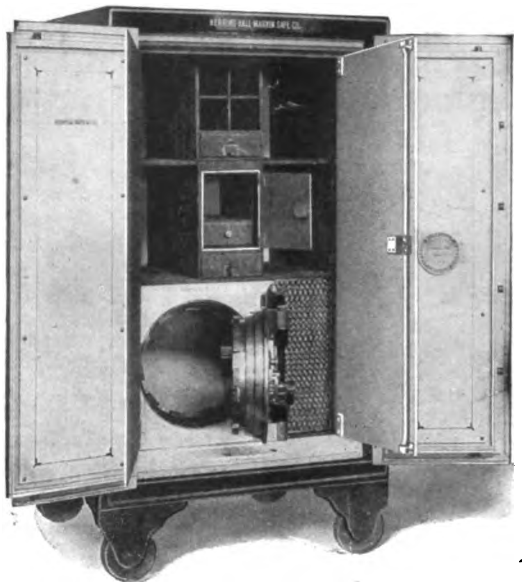
A noteworthy feature of the Commodore Hotel, now in process of erection at Forty-second street and Lexington avenue, New York city, and which, when completed, will be one of the most attractive hostelries in the metropolis, will be hollow trim and sash, to be installed by the Empire Art Metal Works, of College Point, L. I. The owners of the extensive and expensive property appreciate the need for safeguarding guests of the hotel against the fire danger, hence their sensible decision to use metal for trim and sash instead of dangerous highly polished wood.

◆

With a capital of $6,000, the Mining and Clay Product Company has been incorporated at New Castle, Pa.

HERRING-HALL-MARVIN SAFE COMPANY

Designers and Manufacturers of



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SAFES, VAULTS & SAFE DEPOSIT BOXES

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We offer the benefit of our experience of over seventy-five years in the manufacture of fire and theft-resisting safes and vaults and specially constructed Burglarproof equipments for Banks and Safe Deposit Companies.

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Then ask yourself if you ever heard of anyone doing such real service for the fireproofing cause. It is our conception of vital boosting—this jumping right into legislative battles and fighting for ordinances favoring the use of fireproof material in building construction.

CONSTRVCTION is the only publication wholly devoted to consistent fireproofing—it is actively fighting for its constituents—it wants to be measured by the value of the good it accomplishes for your product.

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Have us write or revise your Sales Letters.

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JOINS MANAGERIAL STAFF OF BERGER MANUFACTURING COMPANY

H. J. Richardson has been appointed works engineer for the Berger Manufacturing Company, Canton, O. His new work includes the power plant, new constructions, maintenance and repair of manufacturing equipment and buildings.

Mr. Richardson recently was connected with the New England Westinghouse Company, where he was manager of the gauge department. Previous to this connection he was acting chief engineer of the ordnance department of the Crucible Steel Company, Harrison, N. J., and prior to that for a long time, in fact from the time he began to take life seriously, he was with the Commonwealth Edison Company of Chicago, the last seven years of this service having been in the engineering department.

The Berger Manufacturing Company has been making very extensive growth; and as Mr. Richardson has always been associated with big people, his experience should be very valuable to his new employers.

◆

With a capital of $200,000 the Utah Fire Brick Company has been incorporated at Salt Like City, Utah.

◆

To manufacture a general line of clay products the Clay Products Company has been formed at Huntington, W. Va., with a capital of $100,000.

◆

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912,

of CONSTRVCTION, published monthly at New York, for October 1, 1917.

State of New York, County of New York, ss.

Before me, a Notary Public in and for the State and county aforesaid, personally appeared G. A. Watson, who, having been duly sworn according to law, deposes and says that he is the General Manager of CONSTRVCTION, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 443, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business manager are:

Publisher—Constrvction Publishing Company, 18 E. Forty-first street, New York City.

Editor—S. G. Webb, 18 E. Forty-first street, New York City.

Business Managers—G. H. Stewart, 18 E. Forty-first street, New York City.

2. That the owners are: (Give names and addresses of individual owners, or, if a corporation, give its name and the names and addresses of stockholders owning 1 per cent or more of the total amount of stock.) G. A. Watson, Cranford, N. J.; L. C. Watson, Cranford, N. J.; G. H. Stewart, 911 E. 176th street, New York City.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None. ,

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company, but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the six months preceding the date shown above is —. (This information is required from daily publications only.)

G. A. WATSON, General Manager.

Sworn to and subscribed before me this 15th day of October, 1917.

[Seal] WM. J. SMITH.

(My commission expires March 30, 1919.)

She: "If we must cut down expenses, why not drop your life insurance?"
He: "Not much. That's *your* insurance, not mine. I figure we can trim about all the other items so as to save at least $400 a year, and I'm going to take a hundred of that and buy another Postal policy while I can get it. You and the kiddies may be glad some day."
She: (thoughtfully) "I guess you're right at that, Jim."

Put Life Insurance in Your Family Budget —and Keep It There

THE *real* husband always makes a liberal allowance for life-insurance whether his wife wants him to or not, but the sensible woman *does* want him to when she considers it seriously.

And whether times are hard or easy they both want the most protection possible for their money, and hundreds of them during the last decade have therefore been turning to the

POSTAL LIFE INSURANCE COMPANY

The Postal employs no agents but issues its policies direct. Agents' commissions and office-expenses are thus saved and go to its policyholders.

It is not alone the Company of Safety and Service but also of Saving, for you will find net cost low—lower than ever before—because the Postal's actual underwriting experience has enabled it now to make a

10% reduction in premium rates with a continuance of the annual guaranteed dividend of **9½%**

Besides these savings, the Company pays the usual contingent dividends, depending on earnings.

If you are in good health you should take advantage of the 10% reduction in premium-rates and other Postal economies.

Find Out How Much *You* Can Save At Your Age

on any standard form of Policy—Whole-Life, Limited-Payment Life, Endowment, Joint Life, or on a Monthly Income Contract.

The Postal issues all of the standard forms, and operates under the strict supervision of the New York State Insurance Department and is subject to the United States Postal authorities.

To get exact figures for your age, simply fill out the coupon and mail today.

Remember: No agent will be sent to visit you. The Postal Life employs no agents; resultant commission-savings go to *you* because you deal *direct*.

POSTAL LIFE INSURANCE COMPANY
WM. R. MALONE PRESIDENT
THIRTY-FIVE NASSAU STREET NEW YORK

Postal Life Insurance Company
35 Nassau St., N. Y.

Without obligating me, please send full insurance particulars for my age.

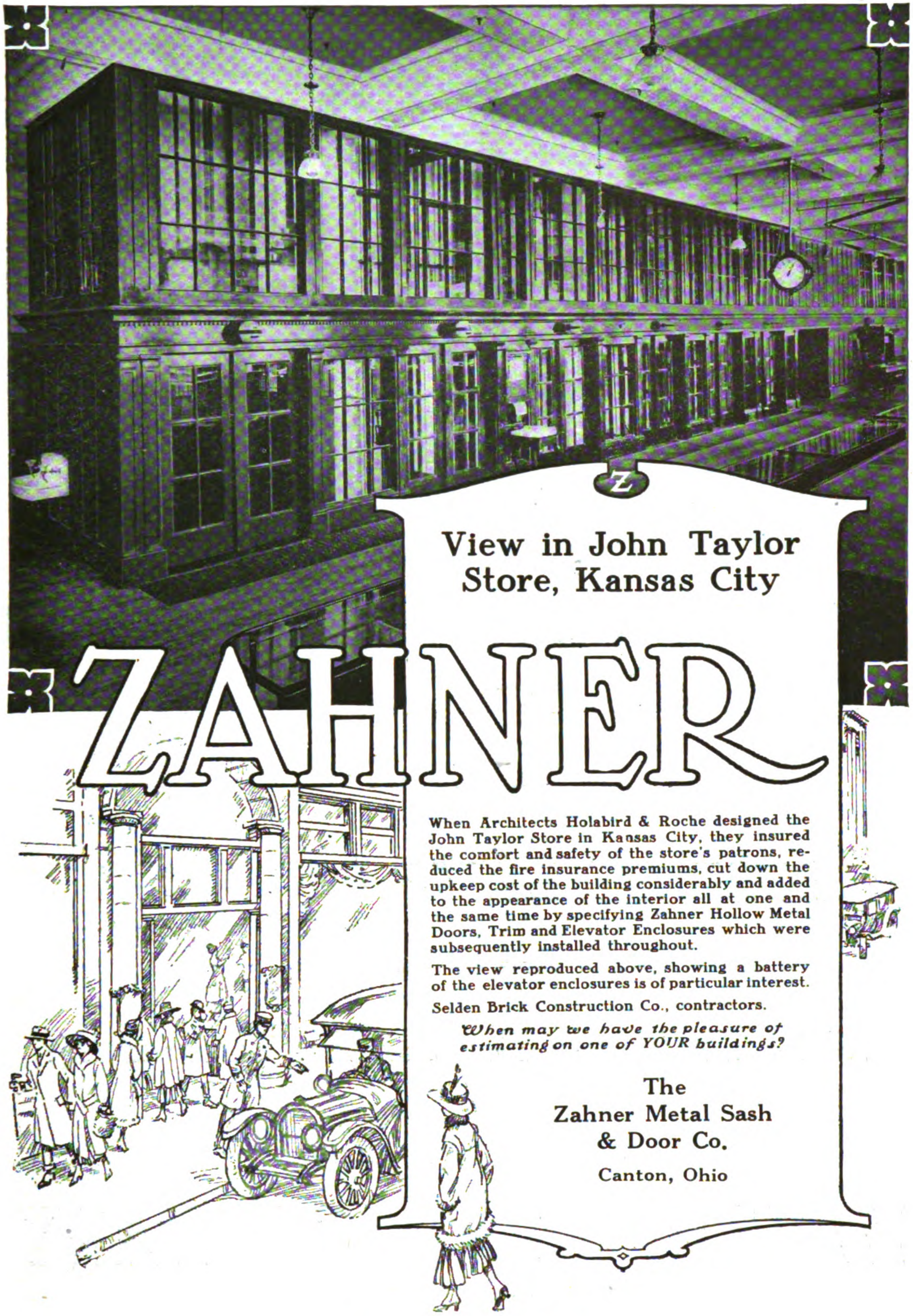
Name ....

Address ....

....

Occupation ....

Exact date of birth ....



View in John Taylor Store, Kansas City

ZAHNER

When Architects Holabird & Roche designed the John Taylor Store in Kansas City, they insured the comfort and safety of the store's patrons, reduced the fire insurance premiums, cut down the upkeep cost of the building considerably and added to the appearance of the interior all at one and the same time by specifying Zahner Hollow Metal Doors, Trim and Elevator Enclosures which were subsequently installed throughout.

The view reproduced above, showing a battery of the elevator enclosures is of particular interest.

Selden Brick Construction Co., contractors.

When may we have the pleasure of estimating on one of YOUR buildings?

The
Zahner Metal Sash
& Door Co.
Canton, Ohio

THE ZAHNER METAL SASH AND DOOR CO.

CANTON
THE CITY OF DIVERSIFIED INDUSTRIES

Branches in all Principal Cities

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Machine Application of a Mastic

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TO STRUCTURAL SURFACES

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The Turner Construction Company appreciates that the freight elevator shafts of an industrial building are virtually its arteries—the most-used channels of its traffic.

DO YOU?

The Turner Construction Company insures to its clients maximum safety to life and limb and utmost protection from fire by providing PEELLE PRODUCTS to safeguard the openings in the freight elevator shafts it constructs.

DO YOU?

Peelle doors have been used in over 75% of the buildings erected by Turner in the past eleven years.

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STEWART AVENUE AND HARRISON PLACE
BROOKLYN, NEW YORK

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FALL,
ARCHITECT

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CONSTRUCTIO
COMPANY,
GENERAL
CONTRACTORS

HOBOKEN LAND AND IMPROVEMENT COMPANY BUILDINGS
OVER 200 DOORS IN THESE BUILDINGS ALONE

.. *The* ..

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Why Not Put Your Window Problems Up to a Window Specialist

Heating specialists—lighting specialists—ventilation specialists. Why not window specialists, too? Isn't a window manufacturer with 20 years of concentrated, specialized experience and a comprehensive line of more than 20 standard types of fire retardant windows, worthy of being considered a window specialist—and as such, worth consulting on all matters of window efficiency?

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POMEROY WINDOWS are made in more than 20 standard types, that you may have POMEROY Quality whatever your window requirements.

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Tests are invariably more severe than actual conditions

A comparison of the results of such tests on the various standard materials used in wall and ceiling construction will convince you that

Kno-Burn
(Trade Mark Reg. U. S. P. O.)
Expanded Metal Lath

unites with the plaster to form a wall of ideal fire resisting qualities.

May we send you details of this and other "Kno-Burn" features?

North Western Expanded Metal Co.
Members of Associated Metal Lath Manufacturers
958 Old Colony Bldg., Chicago, Ill.

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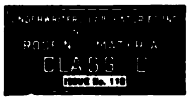
APPROVED BY THE NATIONAL BOARD OF FIRE UNDERWRITERS
TRADE MARK H.M.R. ESTABLISHED 1868

TESTED by the Underwriters laboratories under their standard tests, Reynolds Shingles have proven themselves worthy of classification as fire preventatives.

Reynolds Shingles have a top surfacing of granulated slate, granite, etc., and they positively will not ignite from flying sparks or brands. Where fire originates inside the building they have a marked blanketing influence.

We call them "Safety First" because they protect from rain or storms, from heat or cold and from the common agencies which spread fire.

Reynolds Shingles are the standard asphalt Shingles and you will make no mistake in insisting on Reynolds Shingles.



If your dealer cannot supply you write the factory.
H. M. Reynolds Asphalt Shingle Co.
"Originators of the Asphalt Shingle"
Grand Rapids MICHIGAN

CONSTRVCTION

ADVOCATING THE CONSISTENT VSE OF FIREPROOFING MATERIALS & PROTECTIVE DEVICES

Samuel G. Webb, Editor
Bruce E. Loomis, Ins. Eng. Editor
Wm. Wallace Ewing, Consulting Eng.
Ralph P. Stoddard, Associate Editor
George A. Watson, General Manager
George H. Stewart, Business Manager

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George A. Watson, Pres.

18 EAST 41st STREET
New York, N. Y.

L. C. Watson, Sec.-Treas.

Entered as second-class matter November 3, 1915, at the post office at New York, under the Act of March 3, 1879.

Fire Proofing

A Question of National Importance

The burning of any building that houses an industry engaged in government work, direct or indirect, is now a national calamity, and gives aid and comfort to the enemy.

A building or entire plant protected by

Ambler Asbestos Corrugated Roofing and Siding

cannot burn from within or without. More and more buildings are being thus safe-guarded every year.

AMBLER ASBESTOS CORRUGATED ROOFING AND SIDING is built of cement on a mesh of asbestos fibre—and becomes more and more weather-resistant as the years roll by.

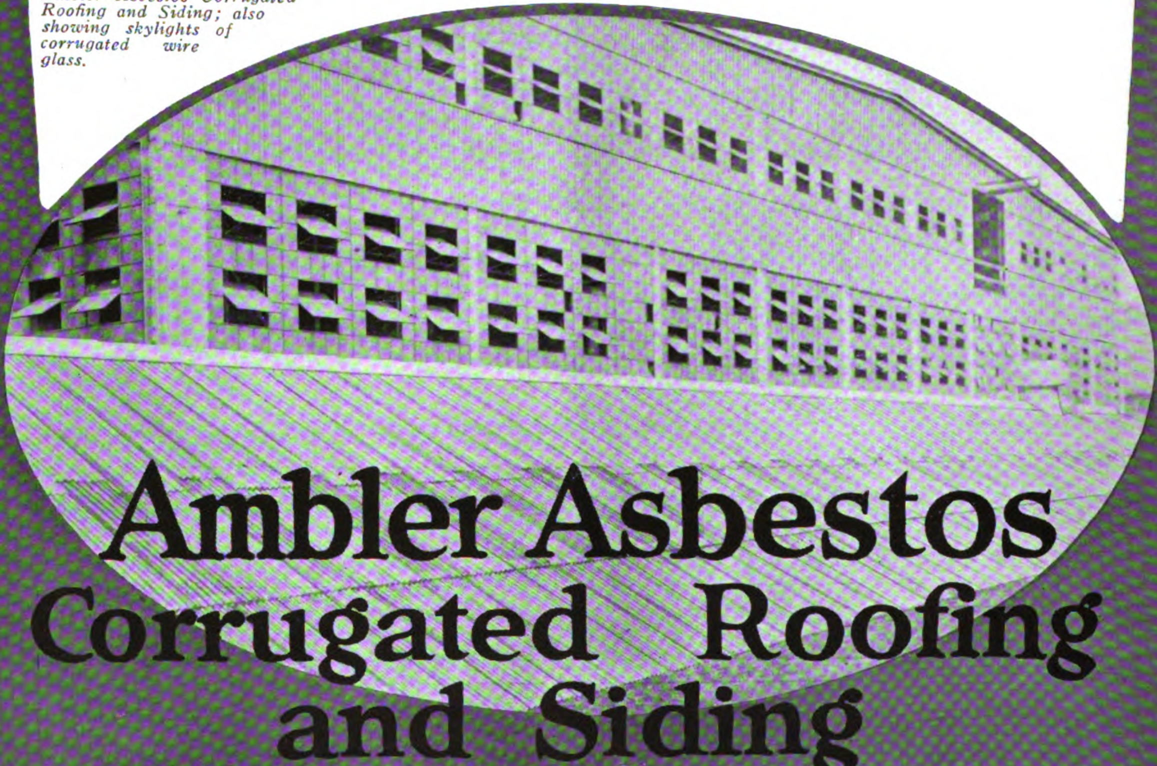
We also have manufactured exclusively for us, a corrugated wire glass to be used for skylights in conjunction with the Ambler Asbestos Corrugated Roofing and Siding. This makes an ideal skylight—it does not leak and cannot burn.

Write for more facts with pictures of buildings covered with Ambler Asbestos Corrugated Roofing and Siding. Prices and estimates on request.

KEASBEY & MATTISON COMPANY

Dept. B-3, Ambler, Pa., U. S. A.

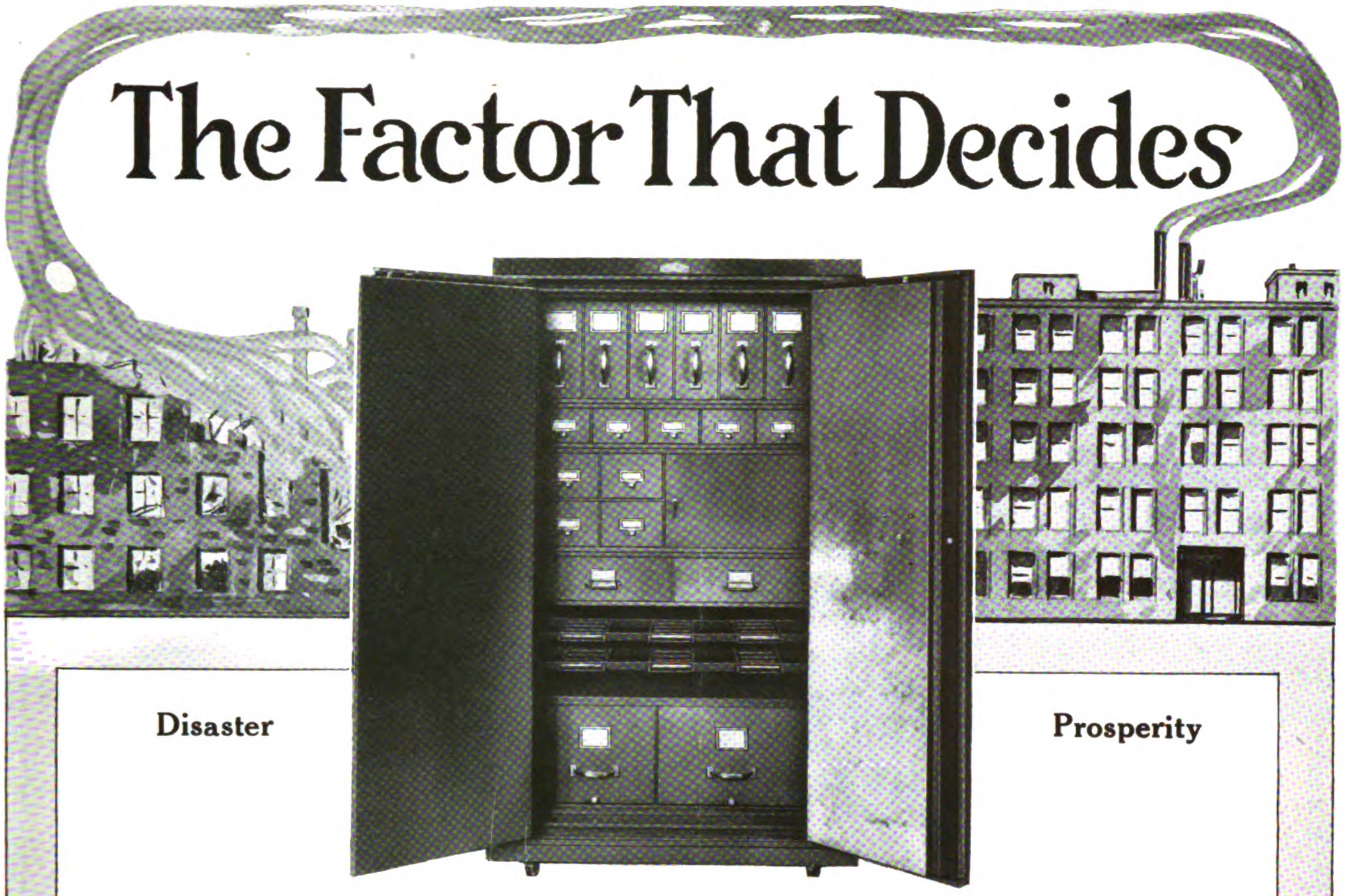
Manufacturers of Ambler Asbestos Shingles, Asbestos Corrugated Roofing and Siding, 85% Magnesia Pipe and Boiler Covering and Asbestos Building Lumber.



Views of shops at Cramp's Shipyard, Phila, Pa., covered with Ambler Asbestos Corrugated Roofing and Siding; also showing skylights of corrugated wire glass.

Ambler Asbestos Corrugated Roofing and Siding

The Factor That Decides



THE SAFE-CABINET

has been the deciding factor in the continued life of hundreds of businesses. It has made secure what could not be insured—the valuable books, accounts, business documents, contracts and other data that make up a "going concern" and keep it going in spite of conflagrations and disaster.

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Fire may visit **you** as it has others. It may destroy your offices. Irreplaceable records, the vital statistics your business depends upon, may be lost forever.

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**Originators and Sole Manufacturers of
THE SAFE-CABINET**

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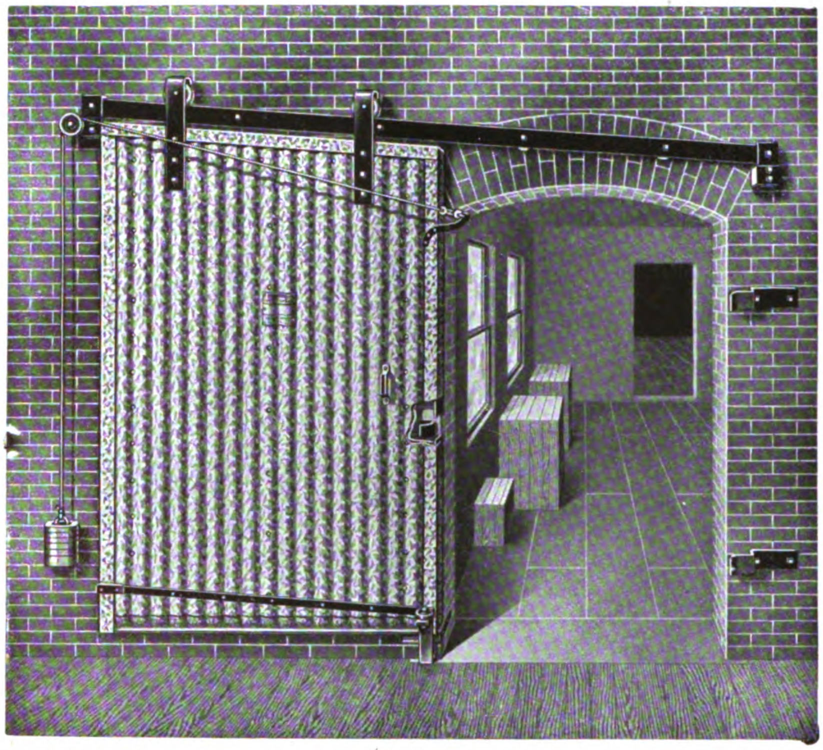
53 Green St., Marietta, Ohio.**

Send at once, FREE copy of "Written in Letters of Fire."

Name.................................

Address.................................

Business.................................



U. S. GOVERNMENT

has purchased for the Ordnance Depot of the U. S. Army at Corozal, Panama Canal Zone, **TEN**—

"ALMETL" FIRE DOORS

(Patent Pending)

As the needs of this building require a door that cannot fail as a fire retardant, the selection of "Almetl" Doors is proof of their ability to prevent the spread of flames.

Approved by Underwriters Laboratories, Chicago, Factory Mutual Laboratories, Boston and National, State and Municipal Authorities.

Send for our descriptive literature.

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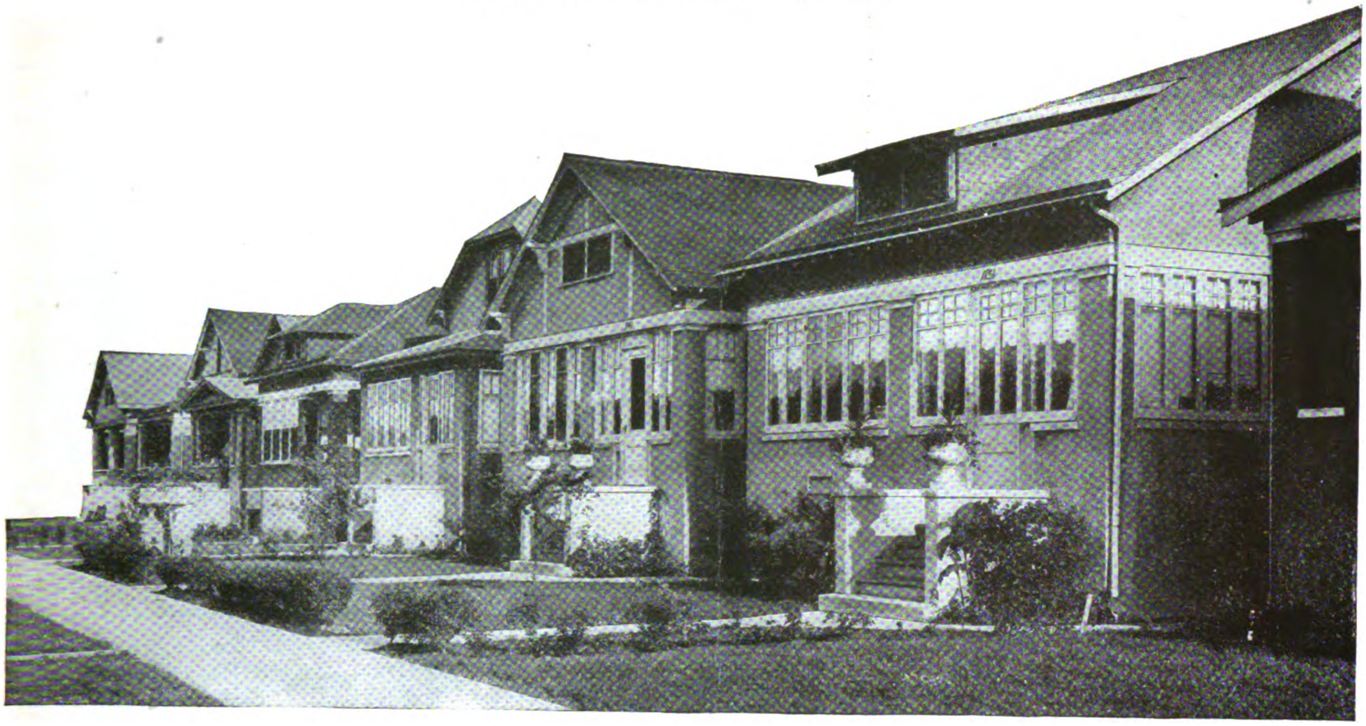


Chicago's $3000 Firesafe Natco Houses

NEILS BUCK, a Chicago architect-builder, has been for twenty years a specialist in small house construction.

At first he built frame bungalows, but during recent years he has made his greatest success in achieving, at an almost equally low cost, homes for people of moderate resources, which are not only much more artistic than frame dwellings but also most comfortable and firesafe.

Including all items, even sidewalks, street improvements, concrete fencing and sewers; the cost of these houses runs from $3100 to $3500 for five and six room dwellings. The exterior walls are 8x12x12 inch Natco Hollow Tile and the roofs are of asphalt, non-inflammable shingles.

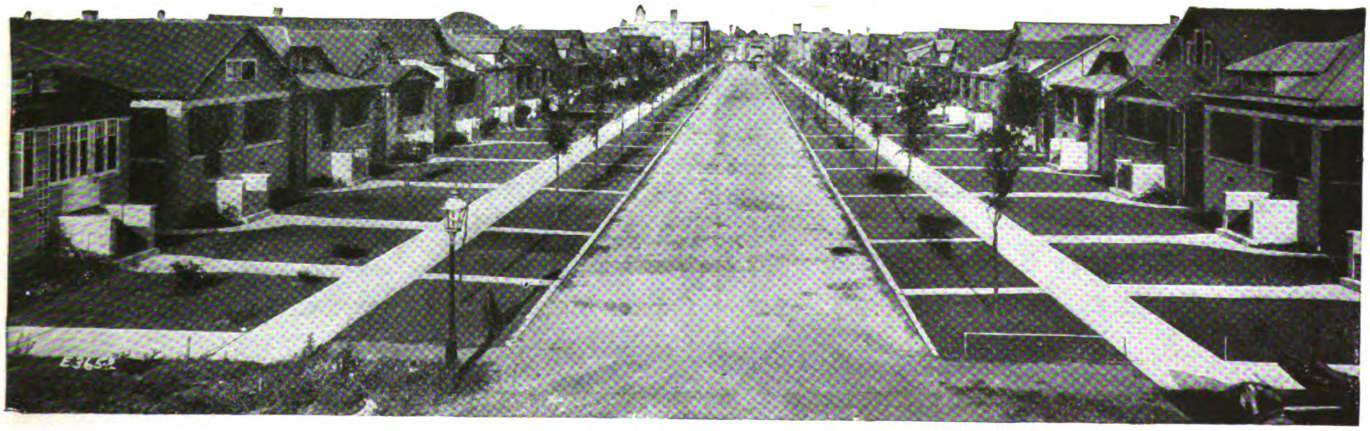
The use of Natco Hollow Tile in small house construction not only means safety, but it means economy because of the low maintenance cost, the lowering of insurance rates and the reduction of heating expense.

The illustrations themselves tell the rest of the story.

If you are interested in any type of residence or garage construction send for literature covering your problem.

NATIONAL·FIRE·PROOFING·COMPANY
610 Federal Street, Pittsburgh, Pa.

23 Factories in the United States. Offices in Principal Cities.



OF the industrial buildings shown in the photograph—all erected during 1916 by the TURNER CONSTRUCTION COMPANY—those marked with a star are equipped with (ESTY) SPRINKLERS—installed by

H. G. VOGEL COMPANY, **12-14 Walker Street, New York City**

Carborundum Co., Niagara Falls, N. Y. Plants 1 and 2.
Hoefler Ice Cream Co., Buffalo, N. Y.
Atlantic Whse. Co., Bronx, New York City.
Union Terminal Co., Jersey City, N. J.
Belleville Whse. Corp., New Bedford, Mass.
Colgate & Co., Jersey City, N. J.
Hudson Motor Car Co., New York City.
American Mfg. Co., Brooklyn, N. Y.
Otto Higel & Co., New York City.

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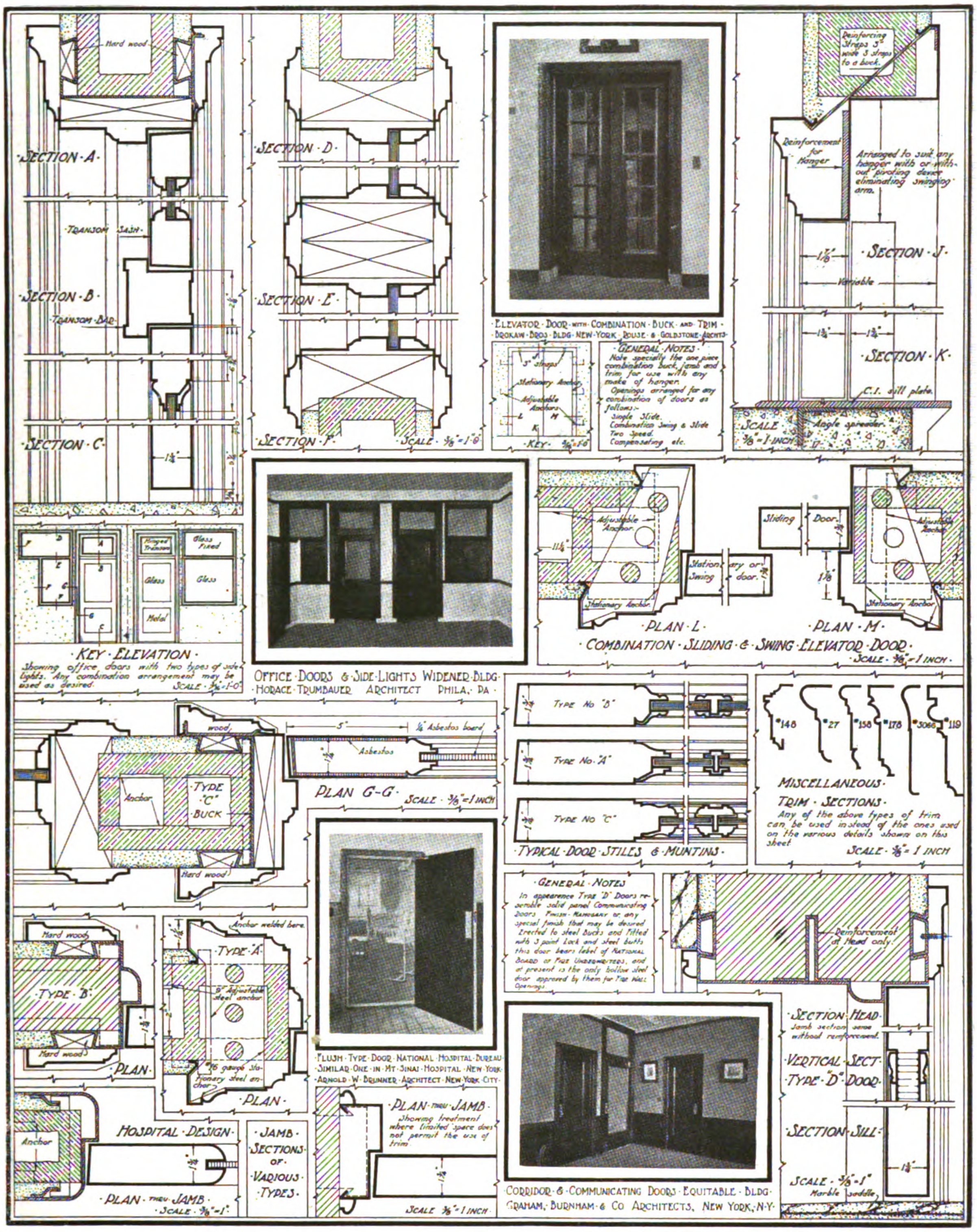
FIRE SAFE DOOR WAYS

STEEL DOORS, BUCKS and TRIM



·ELEVATOR·DOOR·WITH·COMBINATION·BUCK·AND·TRIM·
·BROKAW·BROS·BLDG·NEW·YORK·ROUSE·&·GOLDSTONE·ARCHTS·

·GENERAL·NOTES·
Note specially the one piece combination buck, jamb and trim for use with any make of hanger.
Openings arranged for any combination of doors as follows:-
Single Slide.
Combination Swing & Slide
Two Speed.
Compensating etc.

·KEY·ELEVATION·
Showing office doors with two types of side lights. Any combination arrangement may be used as desired. SCALE·⅜"=1'-0"

OFFICE·DOORS·&·SIDE·LIGHTS·WIDENER·BLDG·
·HORACE·TRUMBAUER ARCHITECT PHILA.·PA·

MISCELLANEOUS·
TRIM·SECTIONS·
Any of the above types of trim can be used instead of the ones used on the various details shown on this sheet
SCALE·⅜"=1 INCH

·GENERAL·NOTES
In appearence Type "D" Doors resemble solid panel Communicating Doors. Finish–Mahogany or any special finish that may be desired. Erected to steel Bucks and Fitted with 3 point Lock and steel butts this door bears label of National Board of Fire Underwriters, and at present is the only hollow steel door approved by them for Fire Wall Openings.

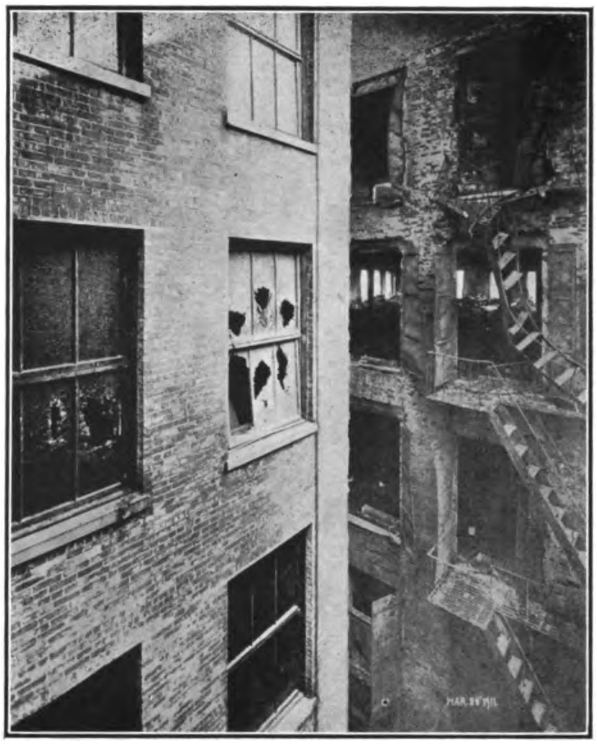
·FLUSH·TYPE·DOOR·NATIONAL·HOSPITAL·BUREAU·
·SIMILAR·ONE·IN·MT·SINAI·HOSPITAL·NEW·YORK·
·ARNOLD·W·BRUNNER·ARCHITECT·NEW·YORK·CITY·

·PLAN·THRU·JAMB·
Showing treatment where limited space does not permit the use of trim

CORRIDOR·&·COMMUNICATING DOORS·EQUITABLE·BLDG·
GRAHAM,·BURNHAM·&·CO ARCHITECTS, NEW YORK,·N·Y·

·EMPIRE·ART·METAL·COMPANY·

·COLLEGE POINT· ·NEW YORK· ·U·S·A·



Note the holes punched in the "Wire Glass" windows by the firemen to enable them to fight the fire in the Asch Building from the interior of the adjacent fireproof building, the "Wire Glass" windows acting as a fire shield.

THIS age or Fireproof Construction compels us to be familiar with materials which are approved Fire Retardants.

Of most importance is the question of properly protecting window openings. Wooden frames and window glass or plate glass have proven a failure. What else is there to do?

Reduce your insurance rates and cost of maintenance by installing Mississippi Wire Glass set in approved metal frames.

If an adjoining or adjacent property burns or is threatened with fire, you need not worry because your property is properly protected.

Write for our descriptive catalogue and samples of Wire Glass.

Mississippi Wire Glass Company

220 Fifth Avenue
New York, N. Y.

7 W. Madison St.
Chicago, Ill.

4070 N. Main St.
St. Louis, Mo.

CONSTRVCTION
ADVOCATING THE CONSISTENT VSE OF
FIREPROOFING MATERIALS & PROTECTIVE DEVICES

VOL. V OCTOBER, 1917 No. 4

Personal Liability for Fire Extinguishment

TWO leading cities of the country—New York and Cleveland—have for several years had upon their respective statute books ordinances holding individuals liable for whatever expense the municipality may have been put to in the extinguishment of fires upon property after the owner had been warned by the fire prevention authorities of existing dangerous conditions and failed to make the required corrective measures.

At least in two instances that we recall collection of substantial sums under the law have been made in New York city, and doubtless similar action has been taken in Cleveland, but of this we cannot speak definitely. Unquestionably, however, the net effect of the ordinances has been to make propertyowners look more closely into the fire safety of their buildings and to promptly observe the directions of the authorities tending to the reduction of the fire hazard. To no inconsiderable degree has the legislation made for improved fire loss records both in Gotham and in Cleveland.

The National Fire Protection Association announces its purpose to aggressively seek the enactment of individual liability ordinances in all of the leading cities of the United States and Canada during the coming winter season, and in the interest of the public at large it is to be hoped that the effort of the Association in such connection will be highly successful.

The Cleveland ordinance governing the matter, which became effective July 12, 1915, reads as follows:

"It shall be the duty of the fire wardens in their respective districts to examine carefully and at all times during the year every house, store or building, and places for the keeping and deposit of ashes and to ascertain and report to the prosecuting attorney of the police court all violations of the preceding sections; and when any fire warden shall deem any building, chimney, stove, stove pipe, hearth, oven, boiler, ash-house or apparatus used or suffered to be used in any building or manufactory unsafe, or shall discover within his district any cause or condition from which immediate danger of fire may be apprehended, he may either remove or abate the same, in case of the neglect or refusal of the owner, agent, occupant, lessee or person in charge thereof, after being directed to do so, or he may serve written notice upon such owner, agent, occupant, lessee or person in charge thereof, directing such measures and will render the same more safe against fire, and the owner, agent, occupant, lessee or persons in charge thereof shall comply with such order of the fire warden within the time fixed by the warden. Provided, however, that such owner, occupant, agent, lessee, or persons in charge of such building, shall be entitled to appeal from such order to a board consisting of the director of public safety, and the chief of the fire department whose decision shall constitute the final order to be complied with.

"Any person violating any provision of any of the foregoing sections of this chapter shall, on conviction thereof, be fined in any sum not exceeding fifty (50) dollars and be further fined in the sum of three dollars (3) for every day said violation shall continue, and in addition in case of fire resulting directly or indirectly from any omission or neglect to properly comply with the written order of the fire warden as provided in the next preceding section, the person or persons culpable or negligent in respect thereto shall be liable in a civil action for the payment of all costs and expenses of the fire department incurred in and about the use of employees, apparatus, and materials in the extinguishment of any fire resulting from such cause, the amount of such costs and expenses to be fixed by the director of public safety and when collected to be paid into the general fund of the city of Cleveland."

The Warwick China Company, of Wheeling, W. Va., has urged the board of education of Wheeling to establish a course in clay modeling in the Wheeling schools. The Warwick Company agrees to pay half the salary of a competent instructor.

If you have a competitor either in manufacturing or selling you will have to push harder than he does or you'll lose out.

Re-Drafting Building Code for Detroit

CRITICISM of the Detroit, Mich., Building Department became so severe that the mayor of the city some time ago appointed a commission to redraft the Building Code, which had become obsolete. The commission has since been steadily at work, and, it is promised, the result of its labors will soon be made public.

Membership upon the commission consists of representatives from the Detroit Engineering Society, Michigan Chapter American Institute of Architects, Michigan Society of Architects, Detroit Real Estate Board, Detroit Section American Society of Civil Engineers, Builders' and Traders' Exchange, Public Lighting Commission, Detroit Bureau of Governmental Research, a former water commissioner, a real estate man, an architect and a contractor and builder. The fire commissioners and the Health Board are ex-officio members.

Experiences Wood Shingle Roof Menace

NEW ROCHELLE, N. Y., one of the most attractive suburbs of Gotham, is the latest community to experience the menace of the wood-shingle roof, and it will be singular indeed if, as a result, the further use of this fire breeder be not absolutely prohibited within the corporate limits of the town.

Sparks carried into the residential districts from fire originating in the mercantile section of the community a short time ago and falling upon wood shingle roofs for a time imperilled the entire town and did cause an aggregate loss estimated at over $300,000.

Cold Weather Suggestions

NOW that we are entering the winter season, owners of properties equipped with automatic sprinklers and other fire-fighting appliances should carefully heed the following suggestions offered by the National Fire Protection Association:

Ascertain if all portions of buildings are properly heated at all times to prevent freezing in any of the sprinkler pipes, particular attention being given to exposed places, such as hallways, entries, stair towers, under sidewalks, show windows, shipping rooms, attics, roof monitors and skylights.

Examine tanks and all pipes, fittings and valves, whether for steam heating, general water service or fire protection. *See that none is frozen* or has been frozen and that they are *all in operative condition*, and where there is any liability of freezing, provide the necessary protection. All metal work supporting tanks should be thoroughly cleaned from rust and painted, also tank hoops.

Examine carefully and provide suitable boxing around any pipe lines which may be in an exposed location (either between ground and first floor, between buildings, or near windows, doors, etc.). Make frequent tests during the winter of such sprinkler systems in order to make sure the piping is not frozen.

Ascertain if sprinkler dry valves are in working order, not leaking, and piping thoroughly drained; if alarm connection and gong are in order; if air pumps can be depended on for the winter.

NOTE.—Do not overlook low points on dry system not controlled by main drain. Blow low points out occasionally to free from condensation.

See that *all valves are open that should be* open, and try water outlets to ascertain if all pipes are free and ready for service.

See that *extra sprinklers* are on hand in case of need to replace frozen or melted heads.

Be sure that engineer or supervising employee is fully posted as to the purpose and intention of every valve and pipe.

Try pumps and see that they are in proper working order.

Test all of the *hydrants* and *indicator posts*, and see that they *drain properly*.

Examine inside standpipes and connections.

Instruct the night watchman thoroughly in the use of all fire apparatus and the operation of all valves.

Examine the end of suction pipe to see that leaves or other refuse matter have not clogged up the holes in the strainer. The capacity of the pump may be greatly reduced by this defect.

Take measures to prevent freezing of water in casks and pails in cold buildings.

Empty and recharge chemical extinguishers to insure their being in perfect working order.

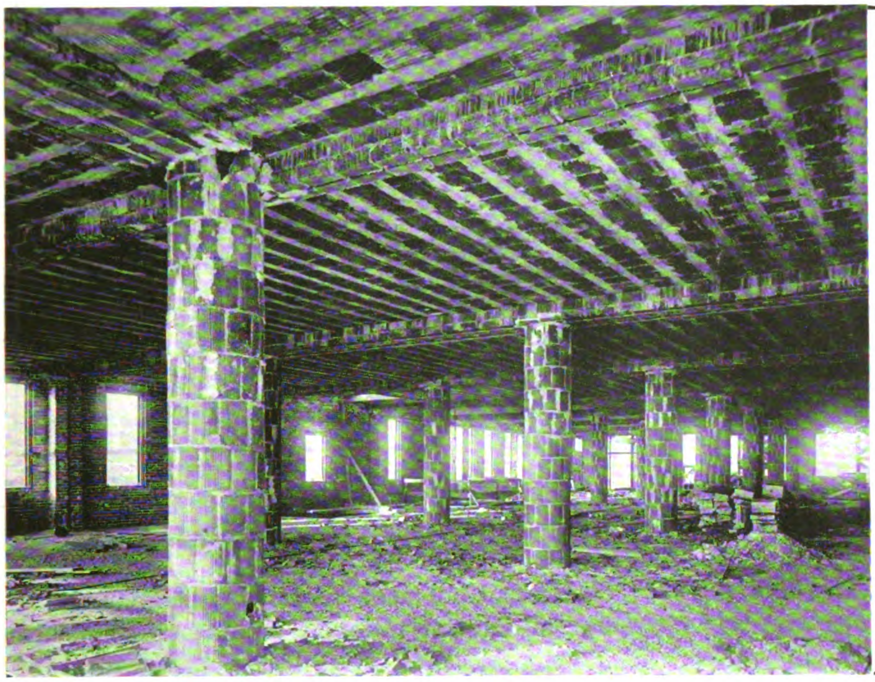
Boosting Clay Products

UP in St. Paul, Minn., those interested in the sale of clay products as a building material, according to the *American Clay Magazine*, have set about boosting sales in exactly the right direction. They have organized and incorporated a company for advertising and promoting the use and sale of clay products building material. If the organization will put characteristic Twin City push back of the plan they will make a record that may stir others to similar action. All that clay products need is advertising, good strong advertising, and the sales will be enormous. The public is willing to be convinced, but it takes selling talk, backed by printing ink and other means of publicity to make the public appreciate just what it has been missing all these years by not using clay products.

Hollow Tile as a Factor in Fire Prevention

By Walter A. Hull

THE development of the American skyscraper ushered in the era of fire-resistive construction. Steel frame construction did away with the existing limits to the height of buildings, solving some of the building problems of the times and creating new ones. The new heights in themselves introduced difficulties not hitherto thought of; there was a limit above which firemen could not fight fires effectively with hose streams, danger to human occupants was alarmingly increased and the tremendous investments in these monstrous buildings were seen to be undesirable risks from the insurance standpoint. There was one logical, inevitable answer to these difficulties: if buildings were to be built many stories higher than the old brick and timber structures, combustible material must enter as little as possible into their construction.



Hollow Tile in Steel Frame Construction, Showing Column and Girder Coverings and Floor Arches

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Courtesy National Fire Protection Association

The old standby as a non-burnable building material was burned clay in the form of brick. Nothing better being available, brick was used, for walls, partitions and even for floor arches, in some of the early skeleton construction buildings. Of course, the objection to the extensive use of brick in this way was the excessive dead load that had to be provided for in the steel work of the building. The obvious remedy was to make burned clay building units hollow instead of solid. There were at that time sewer pipe factories that made some hollow building blocks for foundation walls of dwellings and other small buildings. It was but a short step from these blocks to the partition tile and the first hollow floor arch blocks of burned clay.

Without the skyscraper the development of the hollow tile industry would have been slow and insignificant; without burned clay hollow tile, the earlier growth of the skeleton construction building would unquestionably have been greatly retarded. The development of these two giants, the skyscraper and the hollow tile industry, has wielded an influence in the progress of our attainments in fire-resistive construction which can hardly be overestimated. The tall building, introducing, as it did, new hazards and new problems in building to prevent as well as to withstand fire, stimulated activity in the direction of better design. The necessity brought forth vigorous and effective endeavor. Hollow tile contributed, to a most important extent, to the new order of things, not only by making the relatively quick success of the tall building possible, but also by providing an effective medium, at moderate cost, for fire-resistive construction in other types of buildings as well.

The early days of the skyscraper were trying times for hollow tile. Buildings of the new type were scattered here and there among older, burnable buildings, and the exposures were severe in the extreme. The aggregate amount of interior fuel in the form of floors, doors, trim, etc., was enormous. Unprotected window and door openings were the rule, and in those fires which reached the proportions of conflagrations, everything combustible both within and without the so-called fireproof buildings was consumed. Those were terrific tests. The saying became current that "fireproof buildings were not fireproof"; yet to the fair-minded observer the marvel was not so much that these buildings were damaged in such conflagration conditions as that they survived at all. Instead of condemning them, the building profession set about to eliminate the weak points of the earlier forms of construction and to better safeguard against hazards within as well as exposures without. Shutters, wired glass windows, enclosures of vertical openings and the dividing of large floor areas, together with the introduction of sprinklers and the elimination of most of the combustible structural features, gave better protection to buildings and contents. In much of this improvement hollow tile played an important part, for the very availability of hollow tile for the purpose encouraged the extensive introduction of such forms of protection as partitions and stairway and elevator enclosures, which are of the utmost importance in safeguarding both property and human lives. The effectiveness of adequate fire stops, consistently arranged, has come to be realized in very recent years as never before. The universal adoption of adequate systems of fire stops in large buildings would mean the passing for all time of the large, high-value fire. Confined to small space, no fire, except in explosives, can get beyond control, whereas, as has been demonstrated time and again and in most costly fashion, the fire which finds no effective structural barriers in its path is only too likely to become a raging, racing monster which no human agency can hope to cope with. All those materials and forms of construction which lend themselves effectively and economically to service as fire barriers deserve recognition as important factors in the elimination of fire waste, but it must be remembered that in the earlier development of extensive fire-stop systems, hollow tile was the pioneer, and that without this structural medium the progress of fire control must have been seriously retarded.

Wholesale Use of Facing Tile in an Economical Type of Dwelling House Construction

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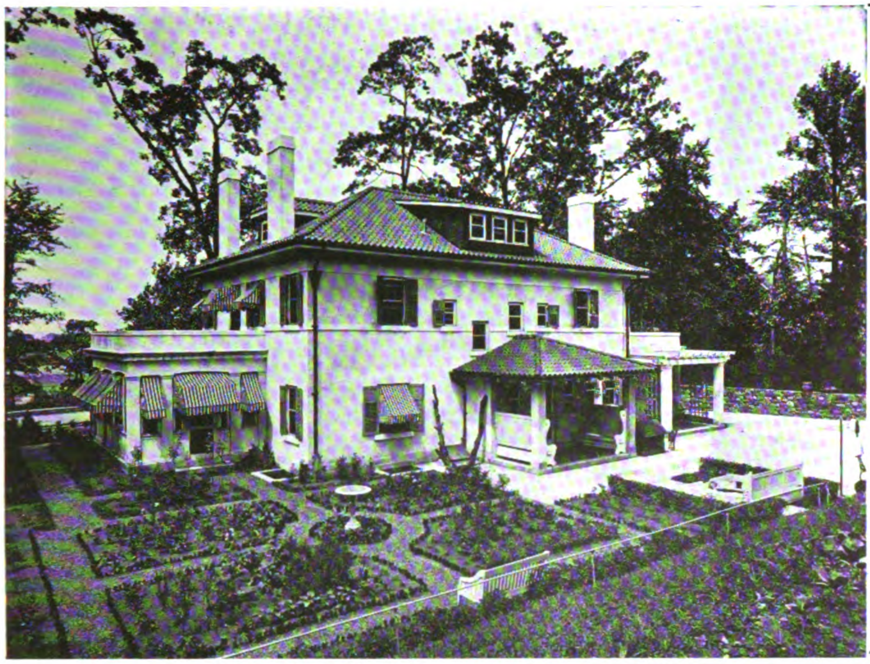
Courtesy National Fire Protection Association

Fire-resistive construction, beginning with the skyscraper, was extended over a wider field, including factory buildings, warehouses and apartment houses. The importance of the part played in this progress by hollow tile may be gauged from the following extracts from a report made as late as 1903 by Rudolph P. Miller, then Engineer of the Bureau of Buildings of the City of New York:

"Nine tests were made to compare the fire-resisting quality of different materials with that of a 2-inch terra cotta block. . . . The Superintendent of Buildings has the power to define what constitutes fireproof material. Terra cotta has been accepted as such ever since the introduction of fireproof construction, and therefore was accepted in these tests as a basis of comparison."

Widely Used for Country Home Building

Yet it is not only in the cities that terra cotta has gained recognition as the standard fire-resistive material; one of the significant features of the increase of wealth and the growth of better standards of living in this country is the development of the modern country house. High class dwellings, remote from city fire departments, make special demands on structural materials. These buildings are not temporary affairs, to be torn down, after a few decades, to make room for



High Class Country Residence, Showing Stucco Over Hollow Tile

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Courtesy National Fire Protection Association

the advancement of a growing city. On the contrary, the conditions are here favorable to the erection of buildings that will endure, without depreciation, for many generations. In such dwellings it is worth while to provide exterior walls that will be proof against dampness and will effectually keep out the cold blasts of winter and the excessive heat of summer. In order to endure for long and to justify the substantial investment which such a house must represent, it must be as safe as possible against fire. Finally, it must be architecturally beautiful. Here again hollow tile supplies the needed material to fulfill the requirements, contributing in no small way to this phase of our national development.

But it is not alone in the homes of the wealthy that this material contributes to our rural improvement. The practical farmer purchases hollow tile for the construction of his silo and the sanitary dairy barn. Appreciating the importance of permanence, of fire safety, and of the comfort and health of his live stock, he builds in the same substantial but economical manner his other farm buildings, including the humble pig pen and the poultry house. So adaptable is this building medium, and so capable of specialization, that farmers are now using well ventilated rat and mouse-proof terra cotta corn cribs for the storage of the corn crop.

Adapted for Industrial Residence Building

Another field of usefulness, and one which bids fair to develop large proportions in the next few years, is that of the individual dwelling of moderate and even of low cost. Year by year the appreciation of permanence and of low maintenance expense is increasing, and the difference in cost between burnable and non-burnable construction is narrowing down, so that it is gradually coming to be recognized that the wall of hollow tile is a good investment, even if faced with brick, and its use in dwellings is steadily coming into favor in spite of the slowness with which building regulations and insurance ratings adjust to changing conditions. Perhaps a new impetus will be given to this tendency, which is highly desirable from the fire protection standpoint, by the introduction of presentable facing tiles. The old hollow tile wall had to be covered up with something else to make it presentable. Brick facing is expensive, and, while stucco is more economical, not everyone wants a stucco house, and it is not desirable from an artistic standpoint that this medium, beautiful as it is when properly handled architecturally, should be given such a monopoly as to monotonize our landscapes. Rather tardily, it seems, but perhaps as soon as building conditions would justify it, the tile manufacturer has now brought forth what seems the obvious thing in the shape of facing blocks of hollow tile. In point of color and texture there is no difference, and no reason why there should be any difference, between the effects producible in clay tiles and those that are so well known and so much admired in clay bricks. The material and the process of manufacture are similar. In the matter of size the tile unit is different from the brick unit because a larger size is more economical and convenient for hollow tile manufacture and erection. How well this new departure is going to appeal to the architect and to the more or less discerning building public remains to be seen. We are used to the brick house, in which the facing unit presents to the eye a surface about eight inches long and two and a half inches wide. The tile house, with the facing unit twelve inches by five, will present a new and, of course, in the beginning, a strange appearance; yet there seems to be no reason to believe that such a unit will not lend itself, in the hands of the architect, to the production of pleasing effects in his general scheme, as well as the smaller unit. Bricks have been made about eight by two and a half, some of them twelve by two and a half inches, or a little thicker, since the beginning of civilization, or thereabouts, simply because such sizes were practical, convenient, economical sizes in which to make bricks. The architect takes them as he finds them and accomplishes much with them. Influenced by other features which he can obtain only in hollow tile, he will undoubtedly take up this new medium, possibly with some hesitation, and obtain from it architectural beauty which may be as gratifying, or possibly even more satisfactory, than those he has been producing with the other mediums at his hand. Should this be the case, the opportunity for hollow tile to render service in the dwelling house field will be broadened, and we may expect this building medium to meet the needs here as it has already done in other types of fire-resistive buildings.

Product Capable of Great Development

Considering the breadth of the field covered by hollow tile and the decades of service that it has rendered, it is rather remarkable how little is definitely known about those fundamental physical qualities which determine its usefulness and particularly its fire-resistive properties. In very recent years there has been some activity along the line of determining the strength of tile blocks and of tile walls, and the results of these tests are gratifying in that they indicate that this class of material has structural possibilities that are capable of further development. On some of the important features of its fire-resistive qualities very little definite information is available. Although it has been performing faithful service in fire protection for decades, this material is subject to criticism because of those cases in which hollow tile partitions and other parts of buildings subjected to severe fire, or fire and water treatment, have been damaged, more or less seriously, entailing the necessity of subsequent repairs. It may be that the extent of such damages and the importance of this tendency have been exaggerated. It is natural that this should be the case for the reason that every injury to hollow tile is plainly visible. Either it is injured or it is not, and, if it is, the damage is always exposed where it will show. Furthermore, a rather unimportant damage, structurally, may show up so obviously and spectacularly as to leave a lasting impression on those who walk through the burned building, making casual observations rather than a technical study. While this may work to the disadvantage of hollow tile in the effect on the mind of the building public, there is, after all, a good side to this very obviousness, for it may be said, in fairness to hollow tile, that it is more honest than some materials because it does not sustain injury by fire without showing the extent of that injury. In appraisal, or in repair, there is very little room for doubt in the case of hollow tile.

Further Investigations Desirable

Unfortunately, no building material that has so far come into use is indestructible or immune to injury from fire and water, and when the backers of one material point to the weakness of another, it is a case of the pot calling the kettle black. One material may be better than another for certain purposes and in certain respects, but there is no one material superior to all others for all purposes nor in every respect. We find many things in favor of hollow tile. We find one thing against it, in its tendency to crack, so that the outer web will break off in some cases of exposure to fire, or fire and water. Such troubles may be expected to decrease with the improvement in our fire prevention construction, for the high-pressure hose stream, in particular, is gradually being eliminated from the fire protection scheme, so far as high class buildings are concerned. However, it is not the right attitude to assume that even moderate losses from this cause are inevitable. We Americans are not fatalists. Neither is it right for the friends of hollow tile to assume an attitude of complacency because of the fact that no other material is free from weak points. We are coming to realize, as never before, that we cannot afford preventable losses. Hollow tile is in extensive use, and it is going to continue in extensive use. Is it not a matter of importance to have an answer to the one simple question: Are the fire losses due to the breaking of hollow tile preventable? It is safe to say that no answer will be immediately forthcoming. There is no answer in our literature and none to be deduced from the information to be gleaned therefrom. The published accounts of fires may be either distorted, according to the zeal of the writer, for or against the material, or descriptions may not be sufficiently definite or complete to convey the essential facts from which to draw conclusions. The reports of the limited number of fire tests that have been made are insufficient, and it seems evident that further investigation along this line is both necessary and promising.

We know that clay is not a definite mineral and that the various clays and shales from which hollow tile is made in various districts, and even in the same district, differ widely from each other in their physical characteristics. The burned products from some clays are more easily cracked by quick heating than those from other clays, and the same is true, to some extent, of different products from the same clay. It has been found that with some materials even a very slight difference in the process of manufacture may make a surprisingly great difference in the nature of the product in this respect. It has been a matter of frequent observation that porous hollow tiles are less subject to fire damage than dense ones; and while there are objections to the very extensive use of porous terra cotta, these observations indicate that we may expect to find other controllable qualities that affect the behavior of terra cotta under fire. These considerations lead to the belief that investigation would show that the product of some factories has less tendency to break under fire than that of others, and that in the case of a factory whose product was found to be objectionable on account of a pronounced tendency toward cracking, improvement might possibly be made if it were systematically undertaken. As matters stand now, we have no satisfactory standards by which to measure or judge the fire-resistive qualities of hollow tile. The individual manufacturer has no way of knowing what is expected, or what ought to be expected, of his product in this respect, and he cannot, perhaps, be blamed for any seeming indifference about meeting standards which do not exist. The individual architect or engineer finds no standards on which to base his specifications, and so he disposes of the matter by writing into his specifications some such perfunctory requirement as "good, hard-burned terra cotta."

Need for Standard Specifications

The contractor is satisfied so long as the goods are delivered on time and are of such character as to permit of their being placed in the building at minimum cost; but the insurance rate which the owner pays when he insures his building includes, we are led to believe, a factor of safety, or of uncertainty, which is in some way related to the fact that some tiles in some buildings have been known to break under fire. It may be unwise for the layman to try to find reasons in the fathomless depths of insurance ratings, but if the writer were to suggest a reason for the fact that more credit is not given for hollow tile than is given, it would be that somewhere, back in the subconscious part of the insurance mind, there is the instinct, or the feeling, that here is an indefinite sort of a hazard which may at some time develop into a definite sort of loss. Back in the subconscious fireproofing mind there may be the feeling that here is a class of material which is superior and has been superior for decades and which has, as a class, or in general, certain inalienable rights, including that of credit without test. While the insurance mind feels that before a material shall have additional credit it should have approval, based on acceptance tests and other requirements, it may be that the fireproofing mind feels that the acceptance test is an artificial sort of thing which does not represent a practical standard. Perhaps a limited amount of systematic investigation, planned and carried out with the one object of eliminating preventable losses in hollow tile, would lead to the adoption of standards that would be acceptable to all interests and would result in an economic saving that would affect, as all large economic savings do, the purchasing public in general. Some suggestions have already been made as to the possible trend of such an investigation. It should be said, in addition, that such an investigation should include a careful determination as to the possibilities of various plasters as protection for hollow tile. Theoretical considerations, as well as the testimony of numerous observers, indicate that the damage to a tile wall is usually due to the quick heating, or quick cooling, or both, of the side exposed to the fire. Plaster has been found to be a moderately good heat insulator; and since the exposed side of structural tile is usually plastered, it seems important to know how much benefit can be derived from the plaster in resistance to this quick heating and cooling. Undoubtedly much depends on the ability of the plaster to stay in place, and therefore if one sort of plaster can be depended on to stay on better than any other, that ought to be known, and generally known; also, if the ability of the plaster to stay in place depends in any large measure on the nature of the corrugations in the surface of the tile which give the plaster a grip on the tile, that ought also to be known, so that this as well as every other practical means could be used for the prevention of economic loss.

Need for Greater Publicity

At the beginning of our participation in a war in which our industrial strength seems likely to be taxed to the utmost, it may seem visionary to dwell on any thought of new investigations of this scope. On the other hand, it does seem worth while that those who are interested in fire-resistive construction, and especially those who are particularly interested in hollow tile, should have these things in mind, so that such information as can be obtained from time to time from various sources may be recorded in such forms as to be available for correlation. Hollow tile is rendering a service of great importance over an exceedingly broad field, and all information is of importance if it is put into such form as to assist in cutting down preventable losses and in making it possible for hollow tile to outdo in the future its services in the past.

A Long Way Toward Conserving the Natural Resources of the Country Would be Taken if Firesafe Building Were Made Compulsory.

A Decidedly Useful and Attractive Product

A RECENT visit by a representative of CONSTRVCTION to the offices of West Texas Mica Company, 74 Broadway, New York City, to inspect samples of work done with its Micholithic facing material, proved to be both surprising and profitable. The surprise was not alone due to the beautiful finish, but also the great variety of colors shown and others referred to as possible to produce; whereas the profitable end of the visit was in the gathering of information which we pass on to our readers, with the belief that it will undoubtedly prove serviceable to many of them.

Micholithic is a facing and finishing material seemingly possessed of a rare combination of virtues that will unquestionably create a profound impression upon the entire construction industries in general, with an added emphasis to the concrete and lumber industries in particular, in that it appears to be a solution of the craze crack and check problem for one, and offers an economical advantage to the other by reducing maintenance cost.

The producers of Micholithic claim for it, among other things, the following: If properly applied it will positively prevent craze cracking or checking in concrete structures; that it waterproofs, fireproofs, and adds life, lustre and beauty wherever applied; hardens and improves with age, both as to quality and appearance; can be easily and economically put on either new or old structures, and be had in practically unlimited variety of color effects, which are natural and permanent.

It gives a beautiful granitized finish to all exterior or interior surfaces of stone, brick, stucco, concrete or terra cotta; also cement brick, cement blocks, artificial stone, structural concrete, ornamental garden furniture, fountains, vases or posts, mausoleums, monuments and markers, mantels, bath rooms, office and bank fixtures, wall board, and also on wood surfaces by use of either metal lath or paint.

Its application to concrete, brick, stone, etc., is accomplished by mixing with cement and using as a mortar. It can be applied thinner, but best results are secured with a 3/8-inch thickness. At present time it is being used in San Francisco as a brush-coat finish, that is, mixed very thin and applied with a whisk broom. This method appears to be giving satisfactory results, but is not recommended at the present time at least, as it has not been sufficiently tested to fully determine how it will hold up.

When used on wood surfaces with paint it is applied on the second coat in dry form, being blown into the paint, with which it mixes and becomes set. As a result of its application the added resistance to heat, water and the elements thus acquired will add at least 100 per cent to the life of the paint and incidentally improve its appearance. In other words, it is substituted for the third coat necessary for a good job—when paint alone is used—doubles the longevity of the paint and affords a better protection to the wood.

It looks as though Micholithic is destined to fill a long felt want and to establish itself as a prime factor in the field of construction.

Concrete Tanks and Standpipes

A BOOKLET recently issued by the Portland Cement Association is devoted wholly to advocating the more extended use of concrete in the construction of tanks and standpipes, both for the use of municipalities and independent manufacturers.

Numerous illustrations appear of standpipes already in use, together with statements of endorsement from their respective owners. The subjoined requirements for work of this character will be found useful:

"Concrete tanks or standpipes must be built by observing well-established principles of concrete construction. These are simple and easily followed; if followed, success is assured every time.

"Each tank is a problem of design in itself, depending upon the use to which it is to be put. Foundation requirements must be studied and met. Concrete mixtures must be properly proportioned. They must also be made with the correct amount of water, so that they can be properly placed. The best consistency is usually described by the word 'quaky' or 'jelly-like.'

"For tanks that are to hold liquids, the work should be carried on uninterruptedly from start to finish, otherwise there may be construction seams marking the finish of different days' work.

"Care must be taken to protect the concrete from drying out. The work must be covered or kept protected by leaving forms in place or in some other way, while the work must be wet down for several days following placing of the last concrete, so that the concrete will harden properly. This detail is important. Workmanship that in all other respects has been good may be made ineffective by neglect of proper protection.

"Many contractors now carry on concrete work throughout the entire year regardless of temperature conditions. If necessay, concrete tanks or standpipes can be built in winter almost as easily as in summer, and with every assurance that the finished work will be successful."

Consideration of the ultimate cost
will compel masonry construction

Waning Popularity of Wood as a Building Material

EASILY one of the most comprehensive and valuable papers relating to building interests issued by the Federal Government in recent years is that entitled "The Substitution of Other Materials for Wood," prepared by Rolf Thelen, engineer in Forest products.

During the past twenty-five years, Mr. Thelen asserts, "the per capita consumption of lumber in the United States fell from about 516 board feet in 1906 to about 375 in 1915, and in some of the older States it has now reached a lower level: for instance, 206 feet in New York."

Prominent among the reasons for the increased use of materials as substitutes for wood, in the opinion of Mr. Thelen, is the growing insistence by committees for firesafe construction and the flat prohibition of the use of wood where formerly it was freely employed.

Another leading cause is the cost of lumber, the prices of which "have increased more rapidly during the past twenty-five years than prices for most of its competitors."

Consider Ultimate Cost

Regarding the displacement of wood by other building products, Mr. Thelen holds that the purchaser, if he has a free choice, pays a higher price for wood substitutes when he considers that in spite of the initial added cost their use will finally result in "lower maintenance charges or greater durability, in reduced risk, or in better appearance."

Confusion in Marketing Lumber

While the manufacturers of substitute products have spent "large sums in the scientific study of properties and processes and the best methods of utilization and in attempts to improve the quality of their output," lumbermen have displayed no such interest.

"For lumber, to begin with," says Mr. Thelen, "there is not even uniformity in the names of the different varieties of timber, and lumber grades and specifications are rarely understood outside of the industry. Milling specifications vary from one time to another and between regions, and in part are imperfectly developed. Means have been provided in only a part of the industry to insure that lumber deliveries to purchasers are in accordance with the grades and specifications ordered and to adjust differences between dealer and purchaser. For the rest, the purchaser must rely upon his own ability to secure what he specifies, or, as a last resort, appeal to the courts."

Building and Construction

General building and construction are by far the largest consumers of lumber in the United States. Data secured by the Forest Service during the years 1910-1913 inclusive indicate that, on the basis of a total annual consumption of 38 billion board feet estimated for 1915, approximately 13 billion board feet were used for planing mill products, sash, doors, blinds and general mill work, and approximately 14 billion feet in rough construction and building, or a total of 27 billion feet. The 14 billion includes sawed mining timber and ties and all lumber used in building, temporary construction, and all classes of rough construction not specifically covered under other heads.

The five principal building materials used in the United States are lumber, concrete, steel, brick and clay products other than brick. The competition of these materials, following rapidly changing demands as well as rapidly changing conceptions of their utility, has undergone a remarkable change during the last few decades. Brick, one of the oldest known construction materials, has always been a competitor of lumber, while concrete has been a material factor only since 1900. The present utility of these substitutes varies greatly. In part, they can be used interchangeably, as in the siding of dwelling houses, where the builder, depending upon his taste, the character of the structure, building restrictions, initial costs, etc., uses lumber, brick, concrete or tile.

Growth of Metal Trim

During 1889 the aggregate value of the metal trim products manufactured in the United States (the term includes steel doors and shutters, window frames, sash and trim, etc.) was $88,515. Twenty years later this figure had increased 3.290 per cent, amounting to $3,005,685.

Roofing Materials

"The 'war of the substitutes' has probably been waged more intensively upon the wooden shingle than upon any other forest product. Both the agitation and the large replacement which has taken place are due in part to the peculiar fire hazard attached to roofing in urban construction. Ordinarily the first and most sweeping restrictions in building codes bear on the use of the wooden shingle. Retail dealers estimate that substitution for shingles has been 7 per cent greater during three years in cities than in towns and rural districts.

"The wooden shingle has undoubtedly labored under the same handicap as lumber as to variations in manufacture and seasoning and irregular grading practice, and has suffered accordingly in competition with substitutes which have complied uniformly with more exacting specifications. There is also the question of appearance in the completed roof. Some of the substitute roofings have undoubtedly gained a preference through evenness of finish and the possibility of color variations which have recommended themselves to architects and owners. The advertising campaigns of substitute roofing industries have undoubtedly been stimulated by the necessity of replacing the wooden shingle to obtain any market at all, whereas in the case of most other substitutes for wood some markets have been available which do not involve substitution.

"Finally, advantages have been gained by intensive investigation of industrial problems, in which the expenditures and undoubtedly the results obtained have in the case of substitute industries far exceeded those of the wooden shingle. In spite of the fact that the shingle is one of the cheapest of finished roofings, substitution has taken place at an increasingly rapid rate, while the production of shingles has barely held its own or has actually fallen off.

"Figures indicate that from 1904 to 1912 the reported output in the United States fell from 17½ to 14½ millions of 100-foot squares, and between 1909 and 1915 from 18 to 12¼ millions. These data are open to the same questions on the score of varying completeness of reports as those given for lumber production. It seems probable, however, that the production of wooden shingles has not increased and that it may have fallen off as much as 37 per cent between 1909 and 1915. The 1915 census conducted by the Forest Service shows a reported production of about 11,282,000 squares and an estimated total production of about 12,000,000 squares. Importations of shingles are reported by the Bureau of Foreign and Domestic Commerce as 637,846,000 shingles in 1901, 824,721,000 in 1905, 674,041,000 in 1910, 1,248,726,000 in 1914, and 1,775,130,000 in 1915. The last number is equivalent to about 2,100,000 squares, so that apparently the total consumption in the United States in 1915 was slightly lower than the reported production in 1912. That in turn was unquestionably less than the actual consumption. The determination of the extent of substitution in roofing is somewhat further involved by the use of the wooden shingle to a considerable but unknown extent for house siding.

A Question of Chimneys

Some builders and architects know, but there are many who do not know, that the new Building Code of New York City provides that builders who build higher than the adjoining buildings are obliged to carry up the chimneys of that building to the height of the new building. This ordinance places no small contract upon the man who erects a twenty-story building alongside of a five-story neighbor.—*Building Age.*

"On the other hand, the production of all substitute roofings, according to the best data available, increased from about 4½ million squares in 1904 to about 13½ in 1914, or 200 per cent.

PERCENTAGE OF THE TOTAL PRODUCTION OF SUBSTITUTE ROOFINGS SUPPLIED BY EACH

Cement tile and miscellaneous	0.4
Clay tile	1.1
Asphalt shingles	2.4
Metal shingles and tiles	6.3
Slate (1913)	8.2
Prepared and ready roofings, including asbestos roofings and shingles	81.6

"Data on slate tile were secured from the 1913 report of the Geological Survey on 'Mineral Resources of the United States.' Reports on asphalt, asbestos and metal shingles, cement and clay tile, and prepared and ready roofings were obtained by the Forest Service through correspondence with manufacturers, but do not constitute a complete census.

"The following discussion of individual types of substitute roofings, taken up in the order indicated in the above table, brings out the comparative increases in their rate of production. Reports were secured from only two makers of cement tile, and their production of less than one-half of one per cent of the substitute roofings in 1914 is too small to influence the total. The output of clay roofing tile, representing about 1.1 per cent of all substitutes in 1914, increased, for 12 firms reporting, from 20,343 squares in 1904 to 154,145 in 1914. Reports from 11 manufacturers, none of whom made asphalt shingles in 1904 and who manufactured but an insignificant quantity in 1909, show in 1914 a production of 311,111 squares, or 2.4 per cent of the total substitute roofing. The reports from 16 makers of metal tile and shingles show an increase of approximately 1,400 per cent in production, from 56,618 squares in 1908 to 853,024 in 1914, practically all of which is due to the increased use of metal tile. The total represents about 6.3 per cent of the substitute roofing now manufactured.

"Slate is second in consumption among the substitute roofings, probably representing about 8.2 per cent of the total in 1914. The production of slate roofing fell from 1,233,757 squares in 1904 to 1,133,713 in 1909 and 1,113,944 in 1913. The output in 1914 is assumed to be essentially the same as in 1913. This substitute for wood thus is hardly holding its own. The production of prepared and ready roofings, including asbestos roofings and shingles, increased 240 per cent from 1904 to 1914, or from 3,267,678 squares to 11,106,966. This class includes about 81.6 per cent of the total production of substitutes in 1914.

"The decrease in sales of wooden shingles due to the inroads of substitutes was estimated by retail dealers at 16.2 per cent from 1907 to 1909, and at 35 per cent from 1907 to 1914. The entire production of substitute roofings probably represents a corresponding decrease in the use of wooden shingles. This amounts in 1914 to 13,605,835 squares; whereas the production of wooden shingles, if assumed to be the same in 1914 as in 1912, amounts to 14,430,000 squares. Shingles thus appear to have held 51.5 per cent of the trade, and substitutes 48.5 per cent. Several types of roofing which are not necessarily competitors of the wooden shingle are not included in the foregoing estimates, including tar and gravel roofing, corrugated iron roofings and tin roofings, except tin shingles. The present substitution for the wooden shingle amounts, therefore, to about 50 per cent of the current consumption of all roofing material. Substitution has been increasing rapidly and promises to continue. The strongest competition during the last ten years has come from composition roofings and asphalt shingles.

"Upon the assumption that each inch of wood in thickness will cut three and one-half shingles and that there are 833 shingles per square (100 square feet), a square of shingles is equivalent to 106 feet board measure. The total substitution for the wooden shingle now amounts, therefore, to approximately 1,440,000,000 board feet. This, however, is not a replacement of sawed lumber.

Lath and Plaster Board

"The wooden lath is being replaced by two distinct classes of products, wall and plaster board and metal lath. The economic and industrial forces which are leading to this substitution are those already discussed, the building code, new forms of construction demanded by present-day tastes, advertising, comparative costs and utility, and the like. The discussion is separated from general building and construction, of which it is logically a part, because the replacement is very largely for wood in other forms than lumber.

Wall and plaster board replace plaster as well as lath, and, to a degree also, finishing lumber in certain classes of construction. Wall board is also used to a certain extent where lath and plaster never would have been employed. It is quite impossible to make a short definition of wall or plaster board which will be applicable to all of the varied products of this character now manufactured; but as the basis for a census the Forest Products Laboratory used the following:

"By wall board is meant those stiff composition building boards made up of three or more plies of wood pulp or paper board. They are usually intended to form interior walls with panel effects.

"By plaster boards is meant those composition boards consisting principally of mineral plaster with or without liners of paper board. They are usually intended to be plastered over for interior finish on walls and ceilings, although at times they may be used without additional plaster in the same manner as the wall boards above mentioned.

"Asbestos wall boards are included under plaster boards. "The growth in this industry during ten years is from a negligible production to 308,214,618 square feet, a percentage increase of 6,745; while during the five years from 1909 to 1914 the increase was more than 300 per cent. Further, the total area of board manufactured in 1914 was nearly 19 per cent of the total area of wooden lath produced, on the basis of 15 lath per square yard. The output of the wall and plaster board industry has, in other words, risen in ten years to almost one-fifth of the output of the wooden lath industry, with every indication of continued future growth. The decrease in wooden lath production discussed below has undoubtedly been due largely to wall and plaster board competition.

"The data on wooden lath production are taken from Forest Service and census publications and converted to an area unit on the basis of 15 lath to one square yard of surface. While the census reports for different years undoubtedly vary in completeness there unquestionably was a falling off in lath production between 1906 and 1915. The amount of the falling off may be nearly 30 per cent.

"A census of metal lath production taken by the Forest Products Laboratory included manufacturers of expanded metal, sheet, and wire lath, and represents the outputs of 20 mills. The increase in metal lath production did not have a marked effect upon the wooden lath industry during the three years for which data are available, although the production was approximately two-thirds of the output of wall and plaster board, according to the latest figures available on each.

"Wall and plaster board have been the greatest factors in replacing wooden lath. Practically the entire displacement has occurred during the last ten years. Metal lath, to a certain extent, are used for purposes for which wooden lath are not suitable. Present indications are that the production of competitors of wood in this field will continue to increase rapidly and that wooden lath will have difficulty in holding its own.

"Assuming that one square yard of lath is equivalent to 3.75 feet board measure and that 15 lath are required per square yard, the present substitution of 22,615,915 square yards of metal lath and 34,246,089 square yards of wall and plaster board approximates 210,000,000 board feet annually."

Popularizing Concrete Construction

UPON the opposite page is shown a group of concrete structures, mainly industrial, all erected during 1916 by one contracting corporation—the Turner Construction Company, of New York City.

The total value of these buildings (70) approximates $9,000,000, and in their construction, among other material, 360,000 barrels of cement and 25,000,000 pounds of reinforcing steel was used.

The completion of the structures worked a distinct gain in the commercial and industrial welfare of the country and added substantially to the taxable wealth of the various communities in which they are located. A by no means further important consideration is the reduction in the potential fire waste of the nation which must result from every properly built and fire safeguarded structure of this character. The Turner-erected buildings are, in the great majority of cases, not only of concrete exterior construction, but in their interior arrangement every consideration is given to insure safety of employees and contents against the fire menace. Fire doors and metal windows with wire glass lights are used; automatic sprinklers, fire alarm systems and kindred preventive and protective devices are installed, while roof coverings are impervious both to weather conditions and the dangerous flying brand hazard. The Turner Construction Company began specializing in concrete building in 1902, since which time it has erected hundreds of structures of this type in different parts of the country, nearly fifty per cent of the work being "repeat orders," indicating the complete satisfaction of the owners with their original efforts.

Chief among the advantages claimed for concrete buildings by the Turner people are the rapidity and security with which they can be built: their freedom from sagging—so important a consideration in the placing of heavy machinery and shafting; the abundance of light and ventilation possible; sanitation, and low maintenance and insurance costs. While the initial expense may exceed that of less worthy structures, the final cost is far less; and the owner at all times has a structure the depreciation upon which is slight and in which his employees work under conditions that permit putting forth their maximum effort.

Though the spring and summer months, of course, are the more desirable for extensive building operations, much of the work of the Turner Construction Company is done during the winter season, and with uniformly satisfactory results.

To cite a concrete case, on January 3, last year, the Turner Company secured a contract to erect a building—five stories, 260 by 50 feet, including plumbing, heating, sprinklers, elevators, etc.—for the Bullard Machine Tool Company, of Bridgeport, Conn. "Delivery was promised for May 28 and a detail speed schedule made out with a due date for each part of the work. The job required 214 tons of reinforcing steel, 5,000 barrels of cement, 1,700 cubic yards of sand, 2,400 cubic yards of gravel, 200,000 feet of lumber, 191,000 brick, 20,000 square feet of window sash and miscellaneous supplies and equipment. Also 30,000 square feet of canvas, 60 stoves and 220 tons of coke to maintain summer temperature around the newly laid concrete."

In spite of unusually severe weather, delays in railway deliveries and unsettled labor conditions, the work was fully completed according to schedule, the Bullard Company moving into the new structure "four days before they expected to."

So pleased were the owners with the way in which the contractors worked that they at once gave them an order for an extension to the plant, which latter has since been finished.

The Turner Construction Company maintains a highly trained staff, whose service at all times are at the disposal of architects, owners and engineers contemplating the erection of important concrete buildings.

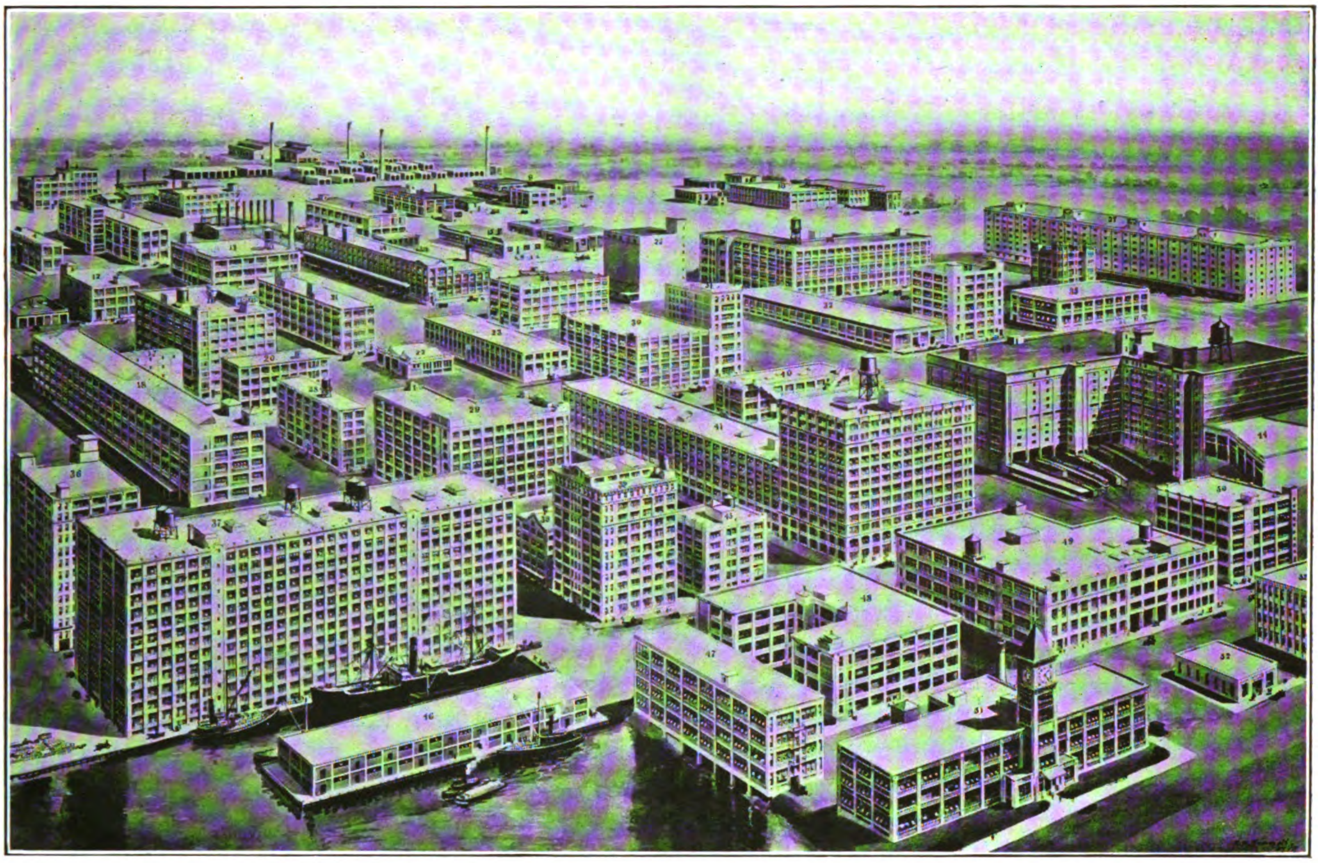
The picture appearing upon the front cover of this issue of CONSTRVCTION shows the attractive use to which concrete may be put in commercial building, being a view of the Biograph Company's headquarters in the borough of the Bronx, New York city. Howard Chapman was its architect and the Turner Construction Company its builders.

Concrete Lumber in House Construction

BOARDS of concrete, with joists, rafters and stair-frames of the same material, are used in the construction of a novel building in Los Angeles, Cal., the whole being set upon a concrete foundation, says the *Scientific American*. Though put together after the manner of a frame structure, the building is as fireproof and durable as the more common types of cement houses, but it requires less material and is lighter in weight.

The various parts are poured into forms on the ground near the site, and in that way the danger of breakage is eliminated. The clapboards are poured in sets of ten, the forms being securely clamped together and the cement allowed to harden.

Experiments in concrete plank making have long been conducted, and it would appear from the above the effort has been successfully accompilshed at Los Angeles.



View of Seventy Reinforced Concrete Industrial Buildings Erected in Various Parts of the Country During 1916 by the Turner Construction Company, of New York City. The Aggregate Value of the Structures is Close to $9,000,000

A Notable List of New Industrial Plant Owners

INCLUDED in the above group of buildings—all erected during 1916 by the Turner Construction Company, of New York City—are those owned by the following individuals, firms and corporations:

Carborundum Co., Niagara Falls, N. Y.; Carborundum Co., Niagara Falls, N. Y.; Vacuum Oil Co., Paulsboro, N. J.; Aluminum Co. of Am., Niagara Falls; American Brass Co., Waterbury, Conn.; Vacuum Oil Co., Paulsboro, N. J.; Sanitary Can Co., Fairport, N. Y.; Beach Mfg. Co., Montrose, Pa.; Vacuum Oil Co., Bayonne, N. J.; Egyptian Lacquer Mfg. Co., Kearney, N. J.; Bush Terminal Garage, Brooklyn, N. Y.; Turner Shop, Brooklyn, N. Y.; Hoefler Ice Cream Co., Buffalo, N. Y.; Wheeling & L. E. R. R. Co., Canton, Ohio; Taylor & Crate, Buffalo, N. Y.; Scovill Gate House, Waterbury, Conn.; Scovill Bridge, Waterbury, Conn.; Scoville Mfg. Co., Waterbury, Conn.

Atlantic Whse. Co., Bronx, New York City; Beaman & Smith, Providence, R. I.; L. A. Dreyfus & Co., Rosebank, S. I.; R. Wurlitzer Mfg. Co., North Tonawanda, N. Y.; Scovill Mfg. Co., Waterbury, Conn.; American Paper Tube Co., Woonsocket, R. I.; Union Terminal Co., Jersey City, N. J.; Bullard Machine Tool Co., Bridgeport, Conn.; Belleville Whse. Corp., New Bedford, Mass.; Kennedy Warehouse, New York; Chalmers Knitting Co., Amsterdam, N. Y.; A. Mendleson's Sons, Albany, N. Y.; Daggett & Ramsdell, New York; Newkraft, New Brunswick, N. J.; Pathe Frères, Brooklyn, N. Y.; Wm. A. Rogers, Niagara Falls, N. Y.; John E. Smith's Sons Co., Buffalo, N. Y.

Robert Gair Co., No. 6, Brooklyn, N. Y.; Hoboken Land & Imp. Co., Hoboken, N. J.; Colgate & Co., Jersey City, N. J.; Robert Gair Co., No. 5, Brooklyn, N. Y.; Oakes Mfg. Co., Steinway, L. I.; Bush Terminal Co., No. 10, Brooklyn, N. Y.; Bush Terminal Co., No. 9, Brooklyn, N. Y.

Protecting Elevator Shaft Openings

THE problem of proper protection of freight elevator shaft openings has been solved to the satisfaction of the Turner Construction Company, since "Peelle" doors are habitually used whenever conditions permit. They fulfill all requirements as a fire retardant, as a safety measure and as an efficient, easily-operated opening protection.

Over 75 per cent of the buildings illustrated in this number are equipped with "Peelle" doors—surely a sufficient proof that *"Peelle Products Protect."*

Corrosion of Steel Reinforcement in Concrete Subject to Sea-water and Salt Air Influences

IN the third article of the series of five on "Concrete in Sea Water," which have recently appeared in the *Engineering News-Record*, Rudolph J. Wig and Lewis R. Ferguson discussed the question of the corrosion of embedded steel in reinforced concrete marine structures.

Inasmuch as the article was written in light of personal investigation and examination of practically all such structures on the coast lines of the United States, Canada and Cuba, the observations and conclusions of the authors carry the greatest importance and authority.

The authors state "that steel embedded in first-class concrete to a depth of 1 or 2 inches, in accordance with existing theory and practice, is not perfectly protected against corrosion by sea-water action."

The importance of this statement, substantiated, as they say, after "most careful investigation and with indisputable evidence," cannot be overestimated. It sets at naught the opinion voiced in the 1917 report of the Joint Committee on Concrete and Reinforced Concrete, which states that "Tests and experience indicate that steel sufficiently embedded in good concrete is well protected against corrosion no matter whether located above or below water level," and which further recommended that "such protection be not less than 1 inch in thickness." This has, up to the present, been the opinion and practice of leading authorities, and the general belief has been that reinforcement is amply protected if embedded from 1 to 2 inches in concrete of good quality.

Former Conclusions Challenged

Messrs. Wig and Ferguson, in taking definite issue with this general understanding and practice, cite many instances where 2 inches and more of concrete protection has not prevented corrosion of the embedded steel in structures varying in age from less than one year to ten years. While the conditions found were general, and not confined to any particular part of the country, the authors' observations demonstrated that the conditions of corrosion were "more pronounced in some localities than in others and certain conditions greatly accelerate the action."

These conditions were: (a) temperature, (b) exposure conditions, (c) quality of concrete, (d) depth of embedded metal; as an instance the authors found structures six and seven years old with only slight signs of deterioration, while others, four years old, were so deteriorated as to be virtual failures.

Practically all of the damage from corrosion occurs *above the high waterline* and very seldom extends below this mark. The observations and conclusions of Messrs. Wig and Ferguson therefore deal with "the corrosion of the embedded reinforcement above the waterline."

They ascribe the trouble to "the accumulation of salts in the pores of the concrete above the waterline by capillarity and evaporation and the absorption by the concrete of air carrying very minute particles of sea water." It does not necessarily follow that such damage is confined to structures at the sea shore, as the authors point out that "finely divided salt spray from the ocean is carried by the air a distance of many miles inland."

The authors ascribe the lack of injury to the parts of structures below the water which have suffered deterioration above the waterline is probably because the air does not as readily penetrate the concrete below the waterline.

The authors frankly admit that it is difficult to find a sure remedy, but they offer several logical suggestions to secure improved conditions; these are as follows:

1. If possible, eliminate metal reinforcing in the parts of the structure above the water.
2. By galvanizing the metal the effect of moist salt air will be prevented or greatly lessened.
3. By using reinforcing rods of smaller cross section area and less reinforcement.
4. By embedding the reinforcement in the concrete as far from the surface as possible.
5. By using the densest possible concrete.
6. By carefully awarding all abrading of the surface of the concrete.
7. By any painting method, if satisfactory material can be found, of the surface of the exposed concrete, so that the surfaces may be made and maintained impervious to air and moisture.

The authors reject the theory more or less generally held that electrolysis is responsible for corrosion.

Messrs. Wig and Ferguson's investigations show oxygen and dampness must be kept from the embedded metal, and therefore indicate that there is a fruitful field for a dependable material and method for coating the reinforcing metal to protect it against corrosion, and also for a painting material or coating which will satisfactorily and permanently seal the surfaces of the concrete, to make such surfaces air and water tight.

By such means it would seem possible—if satisfactory and enduring coatings can be found—to altogether prevent corrosion of the embedded steel and the resulting damage to the concrete, which amounts to huge figures. It should be possible to prevent the percolation of salt water and salt air into the concrete, and it should also be possible to so coat the steel that it is protected from corrosion.

It behooves the manufacturers of paints and preservative coatings to supply this need.

Plain Concrete Exposed to Sea Water

IN last month's issue of CONSTRVCTION the first of the series of five articles by Rudolph J. Wig and Lewis K. Ferguson on "Concrete Marine Structures" was briefly reviewed.

As all of these articles have now been published in *Engineering News-Record,* we are enabled to draw the attention of our readers to the salient features of this highly important investigation.

As before stated, these two engineers conducted an exhaustive personal investigation into the history and condition of practically all the marine structures situated on the coast lines of the United States, Canada and Cuba. The investigation occupied almost two years' time and was conducted under Government auspices.

In the five articles in question the authors describe their findings and conclusions, devoting one of the ar-articles—the third—almost exclusively to the corrosion of the embedded metal on the reinforced concrete structures examined.

As this question of corrosion has its own importance, CONSTRVCTION deals with this part of the subject in another article in this issue.

In this review we deal with the remaining articles which treat exclusively with plain concrete exposed to sea water. The authors, after describing a number of failures or cases of deterioration of the concrete, give their conclusions as to the causes, and from this knowledge as a basis point out how failures or deterioration may be avoided.

Main Causes of Failure

The causes of failure are both chemical and physical, and these are largely interdependent: that is, the physical condition of the concrete may either promote or prevent chemical action.

The chemistry of what happens to concrete in contact with sea water is described by the authors in the following language:

"One of the main constituents of cement is lime. When the green concrete is placed in the forms, the lime of the cement at or near the surface is in a form to combine readily with carbon dioxide in the atmosphere; thus there is formed at the surface and for a slight depth in the mass lime carbonate (limestone), which is practically insoluble in sea water. This layer or skin of insoluble material acts as an armor or protection to uncarbonated cement in the interior of the mass. If concrete is deposited in water it is not exposed to the air, but there is sufficient carbon dioxide in the water to carbonate the lime at the surface, and the same result is obtained. If this is true, why does not the lime of the cement in the interior of the concrete carbonate in a similar manner when exposed, due to accidental abrasion of the surface? The reason is that as cement hydrates over a period of months in the interior . . . . it is changing from the amorphous to the large crystalline form . . . . . When the sea water comes in contact with the lime in its crystalline form . . . . it is dissolved and passes into solution largely as calcium sulphate. . . The dissolving of the uncarbonated lime will continue until the cement is completely disintegrated."

It is vital, therefore, that the outer skin shall not be broken by abrasion or any other cause.

Abrasion can be prevented in different ways, and the design enters into this question very largely. The design should be such as to afford the least possible opportunity for abrasion or erosion. "Sharp corners and edges should be avoided, for these chip easily." Concrete should be protected against the abrading effect of floating ice or logs. The logical way in which this protection can be afforded is by the use of protective facings, which may be of wood or cut-stone masonry. The use of protective facings will prevent injury to the surface of the concrete, and will also prevent the progressive decomposition of the concrete at construction seams. They will also prevent the cracking due to freezing water.

On the subject of construction seams, the authors say: "The simplest way to prevent disintegration at construction seams is not to have any such seams. If the work is done in short sections bulkheaded between the forms the concrete can be brought up faster than the tide rises."

The authors point out that the amount of water in the mix is more important, in their opinion, than, perhaps, the proportioning of the concrete. They say on this subject: "If too little water is used the concrete is porous and the surface lacks smoothness and density; if too much is used the concrete is also porous and the surface chalky and weak. The proper consistency is one just dry enough to permit of *light tamping,* but not so dry as to require any effort to bring water to the surface. They further emphasize this in the following statement: "*Either too dry or too wet a consistency will cause failure.* A medium consistency must be used if permanency is to be secured under severe exposure conditions."

On the question of the quality of concrete the authors discuss proportions of ingredients and thoroughness of mixing. On this latter point they present the importance of thorough mixing impressively in the following words: "A better quality of concrete at less cost can be secured by omitting a considerable part of the cement and increasing the thoroughness of mixing." The proportions of cement and aggregate should be selected to secure the maximum density—and density and strength are closely related. They refer the engineer and operator to Technologic Paper No. 58 of the United States Bureau of Standards for reliable guidance in this matter.

The importance of good workmanship is pointed out and the engineer is warned to be always on the watch for defects in construction even of a minor character. A case is described to illustrate this point. Footings for piers deposited in the water were found to be 50 per cent defective during the progress of the work, which was performed in accordance with usual methods. The engineers by insisting on greater care reduced these defects first to 1 per cent and finally secured results with no defects whatever.

The oiling of forms is discussed with the recommendation that only mineral oil should be used. The authors state that practically any kind of mineral oil is suitable. Two or three applications of kerosene serve well in preventing the sticking of concrete giving no stains. Under no circumstances should fish oil be used.

The authors sound a note of warning that deterioration of concrete structures is progressing all along our coasts, causing loss of great values just because the necessary care has not been exercised in their construction. They state emphatically that "concrete can be used successfully in sea water, but the price of success is eternal care."

The series of articles should be read by every engineer and designer, who will secure therefrom valuable information for use not only in the construction of marine structures but in the general employment of concrete as well.

Famous Copper Roof Badly Pitted

AMONG the group of highly artistic Government buildings at Washington, D. C., none has attracted more attention from visitors since its erection than has the Congressional Library. It is distressing now to learn that the copper roof of this admirable structure, which was laid with great care and at considerable expense, has become so badly pitted as to permit leakage.

From the report upon the subject by Paul D. Merica, associate physicist of the Bureau of Standards, we learn that:

"The greater part of the roof of the Library of Congress, in Washington, is covered with tinned sheet copper material, all of which is from the same manufacturer, and which was installed at the time of the completion of the building, approximately 1893 to 1894. This is 16-ounce sheet, tinned on both sides, and it lies on cement or terra cotta.

"The lower or under side of this sheet has become but little altered in the course of time, except that it has become blackened at points where the sheet is perforated by the holes described below. The upper or exposed side has taken on, for the most part, a dark, slightly greenish, patina, which is dense and coherent, although in some areas there is a whitish tinge, due to the tin or the tin oxide. On this surface are found in fairly dense distribution small pits or furrows, of which the diameter or width varies from 0.5 to 1 mm., the furrows being sometimes as much as 5 cm. long. In many sheets there will be as many as 20 or 25 per square decimeter; in others much fewer. Often these extend completely through the sheet as perforations, through which leakage takes place. The edges of these pits are exceedingly sharp and well defined. Their inside surfaces are sometimes covered with a thin reddish or black layer of copper oxide; often, also, with a thin green layer, which is probably basic carbonate of copper. It was stated that these pits had first been noticed some eight or ten years after completion of the roof.

No Apparent Reason for the Pitting

"Careful examination fails to relate the location or distribution of these pits to any features of service conditions, such as proximity to ventilators, chimneys or to places where soot or cinders accumulate. They occur practically in all of the sheets, both in gutters and on the slopes. They are much less serious in extent on north exposures and in areas within shadow; on the vertical surfaces where the sheets are joined by flanging they are practically absent. These pits are also not arranged in any manner symmetrical to the direction of rolling of the sheet.

"It is to be noted that the Library of Congress is located in a section of Washington, itself uncommonly free from smoke, etc., which is not near power stations or factories producing smoke, such that the atmospheric conditions may be looked on as most unfavorable for corrosion."

A Department Devoted to the Use of

AUTOMATIC SPRINKLERS

Edited
IRA G. HOAGLAND, Secretary **PAUL MASON, Special Representative**
National Automatic Sprinkler Association

"Fireproof" Buildings That Burned

THIS caption is not intended to detract, even to the slightest degree, from the merits of fire-resistant—the so-called fireproof—construction. Nor is anything contained in these notes to be construed as criticism of, or an attack on, fire-resistant materials or accepted methods of using or utilizing them in the construction of buildings.

It is, however, an attack on certain fallacies: a criticism of that state of mind which confuses fireproof with incombustibles, which cannot differentiate between an incombustible building and its combustible—oftimes highly flammable—contents. Those fallacies—that state of mind—have been responsible for an untold and untellable number of deaths and the destruction of millions of property by fire.

Nor must the so-called fireproof—the really incombustible—building be confused with the hundreds or thousands of buildings throughout the country that are labeled "fireproof" on their outside walls in letters six feet high, when a match dropped in a waste basket in any room, on any floor, would start a fire that, in the absence of immediate facilities for extinguishment, would sweep all floors in a red hurricane.

Many buildings of this class so labeled are used as hotels, lodging houses, club rooms, meeting and dance halls, etc.—and they go up in smoke with great regularity, often with loss of human life. The writer recalls a hotel in an Ohio city. More than twenty-one years ago it was an office building and served that purpose for many years. Then a brewer got hold of it and changed it over to hotel occupancy—an ordinary brick building of what was regarded as good construction twenty-five or thirty years ago, in the reddest block on the underwriters' map of that city. Its fifth story towers above the four-story mercantile building adjoining on the south and is overshadowed by the mercantile building to the north. The whole area of that fifth-story south wall is occupied by the name of the hotel in two-foot letters and the word "fireproof" in six-foot letters.

Such buildings as this are not fireproof, or even fire-resistant. About the only thing in them that may be expected to survive attack by fire is the brick in their walls; and too often these, made by the standards of bygone years and laid in old-time mortar, crumble in the hot breath of the flames. Their name is legion, and, like the devils that entered into the swine and ran down into the sea, they should be cast out of the fellowship of decent buildings and made anathema wherever men and women work for safety to life and property from fire. They have no legitimate place in an American city in these days of war-stimulated conservation on behalf of patriotism.

Contents Still Present Great Hazard

Broadly speaking, the fire-resistant building can save nothing except itself, and it cannot do that unless all exterior and interior vertical and horizontal openings are fire-stopped; floors and ceilings, as well as walls and partitions, made of fireproof material; all combustible trim eliminated, and all other requirements of fire safety fulfilled with respect to materials, arrangement and equipment. But even at this, the most fire-resistant building in the world cannot save its contents from burning if fire develops. It is the contents of a building that makes the fire, and the aggregate of contents fires makes a total of contents losses that far exceeds the aggregate of building fire losses.

One of the most fireproof things in the world is a stove, which is built for the express purpose of burning its contents.

Most so-called fireproof buildings are merely exaggerated stoves.

Their contents, whether of stock, material or human lives, singly or in combination, burn with great frequency and often with disastrous results.

It follows that the safeguarding of contents is the thing to be accomplished, once sound construction has been made an established fact.

Danger of Unprotected Openings

But even a so-called fireproof building is not immune from damage or destruction by fire. The Edison conflagration in the great West Orange (N. J.) plant in 1914 swept in seven hours through nine "fireproof" buildings of a high type of construction, despite all that a large and heavily reinforced fire department could do. These buildings, constructed of incombustible material in the best manner that building architecture and engineering could devise, nevertheless lacked certain structural features, or safeguards, that virtually assured the spread of fire within buildings and from building to building. Unprotected vertical and horizontal openings in incombustible walls and floors made certain the successive ignition of highly combustible contents in individual rooms and buildings by linking up the contents of these rooms and buildings with those that lay beyond, above or below. For these fatal defects the owner and the architect were jointly responsible.

So, also, with the Mullen & Buckley storage warehouse at Far Rockaway, N. Y., which was badly damaged by a relatively trivial fire, November 10, 1916. This was a seven-story and basement reinforced concrete building of the highest type of construction. An exposing fire from a three-story frame woodworking shop broke in, traveled from floor to floor, and virtually wrecked the building—shattering columns, beams and girders in four stories, demolishing part of one floor, doing considerable structural damage in another story and severely cracking and buckling outside walls.

The structural damage was so severe that the National Board of Fire Underwriters issued a special report on the fire, copy of which, copiously illustrated, may be obtained by addressing Prof. Ira H. Woolson, consulting engineer, 76 William street, New York.

Notwithstanding the severe damage to the building, this report says, concerning the fire in the fourth story:

"There was a heavy stock of furniture on the north side, but it was only scorched, and the pine board partition proved an effectual barrier to the west."

In the seventh story, also, a "plain pine board partition held the fire from spreading until firemen were able to extinguish it."

In this fire a few small holes through walls and floors—mere pipe holes, ranging from 1 to 4 inches in diameter—were sufficient to carry superheated gases from one compartment to another. These, coming in contact with the combustible contents, started a series of separate fires in various compartments that caused an aggregate of about $125,000 loss.

Recognize Value of Sprinkler System

And what is the cure for ailments of this kind?

The National Board outlines it in a few terse sentences:

"The one fact that stands out above all others is that a suitable sprinkler system would have saved the concrete building with its contents and probably would have controlled the fire in the frame building.

"Although the area was not excessive, it is quite apparent that, had the floor space been divided by partitions of even moderate fire-resistant capacity, the fire would have been localized and a large proportion of the damage prevented.

"The folly of erecting a high-grade, fire-resistant building in all essential structural features and then allowing its efficiency to be ruined by permitting unprotected openings, even of small size, in walls and floors was strongly emphasized."

These are three of the numerous conclusions reached by the National Board concerning this fire, and they are all within the purview of the architect. They involve mere details of arrangement and equipment, and not nature of material—for this was a fire-resistant ("fireproof") building.

Responsibility of Architects

To point out that the architect is responsible for them does not mean that incombustible materials should not be used, even though in two instances in this fire plain pine partitions served as fire stops. It does mean that, regardless of the material used, the proper safeguarding of structural members is more important than their material, and that the combination of safeguarding methods and segregation of hazards, coupled with automatic means of alarm and extinguishment of fire, in case one develops, is the only assurance of fire safety. For these things the architect is largely responsible.

Ohio Leads in Pottery

According to a recent bulletin issued by the United States Geological Survey, Ohio's pottery products in 1916 increased in value $3,511,754 over 1915 and constituted 40 per cent of the value of the output of the entire country. Ohio makes every kind of pottery classified in the Survey's report except china. Its principal product is white ware, the output of which was valued at $11,834,913, or 61 per cent of the value of the State's entire pottery output and nearly two-thirds of the value of the output of the white ware in the entire country. New Jersey is the second State in the making of pottery.—*American Clay Magazine.*

Convention Dates

American Face Brick Association, French Lick Springs Hotel, French Lick, Ind., December 12, 13 and 14. R. D. T. Hollowell, Secretary, Fulton Building, Pittsburgh, Pa.

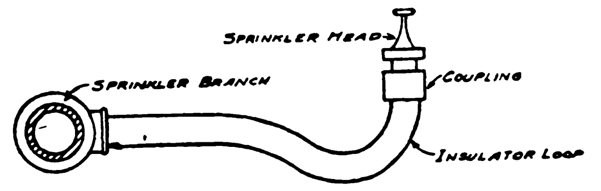
Face Brick Dealers Association, French Lick Springs Hotel, French Lick, Ind., December 12, 13 and 14. Harold W. Holmes, Secretary, Detroit, Mich.

Heating Buildings with Sprinkler Systems

By E. D. Densmore*

THE fact that the installation of a system of automatic sprinklers is becoming more general in modern commercial and industrial buildings has led to the development of the sprinkler system for heating purposes.

As is well known, the sprinkler system consists in general of a series of pipes which cover uniformly the ceilings of all floors. If the water which is maintained in the sprinkler system could be heated and circulated, of course the sprinkler piping could be used for heating. One fundamental objection would be that the sprinkler head which is in ordinary use would melt at the temperature necessary for the water if it were to be used for heating purposes. This melting of the sprinkler head is prevented by means of a U connection through which the hot water cannot circulate. It has been found in practice that such a device will prevent the head from melting. A sketch of this insulator or U connection is shown herewith.



Bend Required to Protect Sprinkler Head from Hot Water Action

Courtesy National Fire Protection Association

In order to make sure that all the sprinkler piping will be an efficient heating surface, it is necessary to connect up the sprinkler mains and runouts so that circulation takes place through all the pipes, as shown in the accompanying diagram.

The connections of the hot water heating system with the sprinkler piping are exceedingly simple and need not change the sprinkler piping in any way. The hot water heater may be located in any convenient place, either in the building to be heated or in an adjoining building. From the hot water heater a hot water supply pipe is run and connected to the foot of the sprinkler riser inside the sprinkler alarm valve. It is advisable to install an ordinary stop valve at this point, so that the hot water supply may be entirely shut off from the sprinklers when necessary. Between the hot water connection to the riser and the sprinkler heads no changes are made, the sprinkler riser, laterals and distributing pipes being installed in the usual way.

The amount of heat which is required in any building is, of course, proportional to the exposed glass and wall surface, so that if a building were very narrow and the exposure proportionately large, the amount of heat obtained from the sprinkler system would perhaps not be sufficient to heat the building. On the other hand, if a building were very wide the amount of heat obtained by circulating the water in the sprinkler system might be adequate for heating.

In practice, it is found that when the conditions in a building are such that circulating the water in the sprinkler system will give adequate heat, the cost of the combined system is less than the cost of a separate sprinkler system and a separate heating system. If the sprinkler system does not give sufficient heat it is necessary to add radiators or coils. This complicates the scheme somewhat, but, of course, up to a certain point additional surface can be installed and still have the combination scheme cheaper.

The general arrangement of the system is such that the water in the sprinkler system is circulated upward through the building and back through the heater. This circulation will take place by gravity when conditions are favorable or it can be forced by a pump. Whatever pressure is on the sprinkler system will, of course, be on the heating system.

It is necessary to arrange for the expansion of the water. If the building is on a tank this expansion could be taken care of through the tank. The ordinary sprinkler system has check valves on both the tank supply and on the street supply, so that some special scheme for expansion is usually necessary. Sometimes a pressure expansion tank is installed or else by-pass connections are placed around the check valve. If cast-iron radiators are to be used, it is to be borne in mind that in high buildings the static pressure on the lower floors is considerable.

Simplicity and Initial Cost

The advantages claimed for this combination system are simplicity and first cost. These claims would be justified where the sprinkler system would supply the larger part of the heat necessary. It is also claimed that the sprinkler pipes, having water circulating all the time, are less liable to become clogged up. It is further claimed that a uniform distribution of heat is

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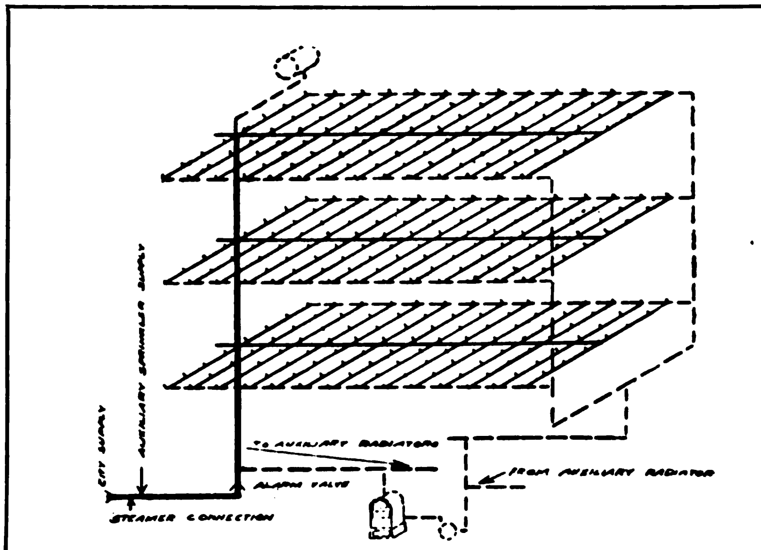
* From a paper before Convention of the National District Heating Association.



Broken Lines Show ,Piping Necessary to Utilize a Sprinkler System for Heating Purposes

Courtesy National Fire Protection Association

obtained. This is true, but, of course, it is also true that the heating surface is all on the ceiling, which, in some cases, would not be desirable, particularly where heat is required under windows to prevent drafts.

In general, the objections to such a system are that it is undesirable to mix up the fire protection system with anything else. The inspection and maintenance of the fire protection system is of great importance, and it is a grave question whether or not it is wise to combine this system with the heating system from the point of view of fire protection. The necessity of having the sprinkler heads connected with the U connections makes it possible for sediment to collect in these U connections, since no circulation takes place through this pipe.

In general, it may be said that this system offers an opportunity for a wide range of usefulness, and it might be expected that as time goes on the field which it will occupy will broaden. Many successful installations have been made, and apparently no fundamental difficulties have been encountered over a period of several years in operation.

Canada's Unenviable Record

UPON the authority of the most recent report of the Dominion Commission of Conservation, Canada "has the greatest fire loss per capita of any country in the world from which statistics are available;" and, not that alone, but "the per capita loss is constantly increasing. Conditions are growing not better but worse."

For the period 1912-15 inclusive, the per capita loss in various American and European countries was as here shown: Canada, $2.97; United States, $2.26; Spain, $1.86; France, $0.75; Germany, $0.29; Switzerland, $0.13.

That the per capita fire loss in Winnipeg—one of the most progressive communities in the Dominion—amounted to the heavy sum of $3.75 during 1916, impelled the Research League of that city to make an exhaustive study of the local fire hazard and to suggest measures whereby it might be reduced. According to the findings of the League:

"Winnipeg's comparatively dry climate, the high winds, the long months when buildings must be heated, *the large number of frame houses and the prevalence of wood shingle roofs* all contribute to make the fire risk abnormally high. Only if its fire department is kept up to the highest level of alertness and efficiency can it cope with such unusual risk."

Among other suggestions offered by the League for improving the fire-breeding conditions of Winnipeg are the following:

Legislation extending the present fire limits; restricting the use of wood shingle roofs—"a most fertile cause of fires;" a revision of the building code—undertaken "in consultation with the underwriters," and requiring that "buildings of hazardous occupancy, especially where large numbers of people are employed or congregated, be safeguarded against fire by the installation of automatic sprinklers; the enclosure of vertical openings, or such other methods."

The Albany, N. Y., State fair had a fireproof exhibit. This is an excellent idea, and any brick maker could unite with the masons of his community in such an exhibit. Why not build a brick office for permanent headquarters at your local fair.

SAFE HOMES

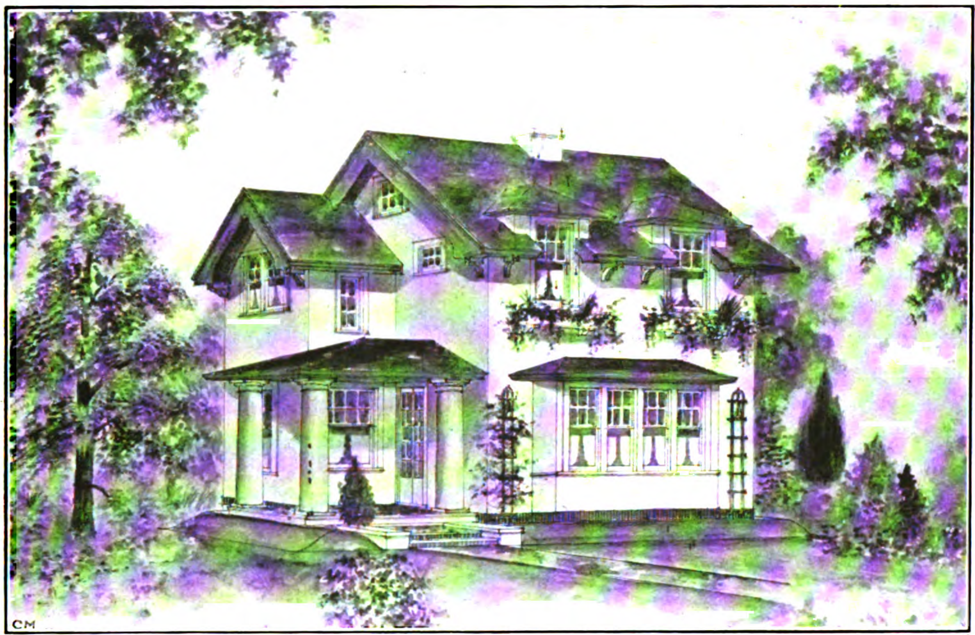
Edited by RALPH P. STODDARD, Secretary
Society Advocating Fire Elimination

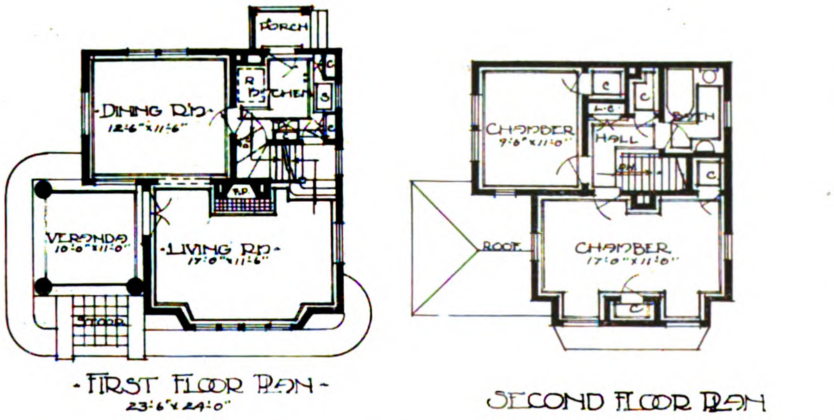
An Artistic Little Home

A STUDY of small homes, no matter where located, shows a decided lack of design. The product largely of contractors after stock designs, they are a real offense to the eye of any but lifelong city dwellers, whose visions are tuned to skyscrapers and billboards.

Here and there, however, architects are giving thought and study to small homes, with excellent results. There are to be found small homes that are really artistic, without being costly. The one illustrated is a particularly good example. It is an ideal home for a small family. Its five rooms are large, well lighted and conveniently arranged. The living room, particularly, with its large bay, whose windows are unobstructed by a porch roof, is exceptionally livable.

The design of this little house calls for use of stucco hollow building tile, faced with cream or white stucco. Green tiles of burned clay or asphalt cover the roof. The small amount of exposed woodwork will reduce exterior upkeep to the minimum. Cost, about $4,500.





Stucco Hollow Tile Built House, With Incombustible Roof

Magnitude of the Building Industry

"PEOPLE outside range of its activities do not realize that building, with its many allied interests, constitutes one of the country's gigantic industries. It ranks with railroading, agriculture and steel making. It deserves consideration equal with them and should be recognized as one of the country's vital activities.

"In 1916 twenty-four cities spent $600,000,000 for new construction alone. And this is but a tithe of the aggregate for the country at large, aside from the other hundreds of millions spent annually for sewer, landscaping, sidewalks and other improvements dependent upon building activity.

"In face of such facts as these, a banker said to me a few days ago: 'We have money to loan for business and industry, but none for building. We consider building as extension work and feel our first duty should be to keep the going enterprises on their feet through these uncertain times.'

"With such a perfect misunderstanding of this industry on the part of one expected to be posted on affairs of financial economy, what wonder the public at large—the vast body of renters and would-be and prospective builders—receive as gospel the falsehoods and misrepresentations regarding prices and insecurity of investment dispensed by those who profit by curtailment of new construction?"

Thus Ralph P. Stoddard, secretary of the Ohio Builders' Supply Association, summed up "what is the matter with the building industry" in an address before the Ohio Association of Builders' Exchanges at its annual meeting in Akron, Ohio, on October 25. Stoddard further said, in part:

"Wherever you find a live manufacturing city you will see evidence of new factories or extensions. Yet there is every promise of a sharp falling off in new building unless banks resume construction loans. I am positive stringency of money for this purpose—not high prices—is the real cause of decreased activity in this industry.

"In regard to prices, my opinion is the talk of high costs killing the building activity is a matter largely of 'indoor sports' on the part of contractors. They are fiends for low prices.

"Do they know the average increase in building materials is only 30 per cent?

"Have they compared these advances in other lines: coal, 123 per cent; copper, 118 per cent; other metals, 107 per cent; steel products, 250 per cent; canned goods, 100 per cent; all labor, 34 per cent; woolens, 100 per cent; machinery, 68 per cent; lard, butter, eggs, 100 per cent; wheat, 93 per cent?

"It is not to be denied there have been advances in building materials. But the essential consideration in this regard is that virtually every material entering into building comes from the ground. Labor becomes a factor in it from the very moment its evolution into the finished product begins.

"Figures show the average increases of 30 per cent building materials has been more than consumed in the 34 per cent average advance in labor.

"But does the public stop eating because the loaf of bread you get now for ten cents may be slipped into a vest pocket? All the leading grains have gone up more than 100 per cent. The paper the merchant wraps your groceries in costs him 30 per cent more than in 1914. Beans—the free lunch standby—now rank among the luxuries, 75 per cent above previous highest price. Gasoline for autos—and it's of poor grade—is 100 per cent more than when common brick sold at $7 a thousand. A dollar at the market attracts as much attention these days as a boy scout at one of the army camps. Still there's panic that builders' supplies show increase of averaging 30 per cent.

"Will prices be lower?

"Nothing short of a general panic, in my opinion, will bring prices back to old levels. The law of supply and demand is at work as usual. With millions of men going to war, how can labor be any cheaper? Can prices be reduced until manufacturing and handling costs are reduced? At present we have a state of affairs where firms whose normal output is a hundred cars a day are curtailed by scarcity of labor and materials to a small fraction of their capacity. Yet overhead remains unchanged. Surely they will not reduce prices under these conditions.

"We must take conditions as they exist: The world is at war; every situation is unusual; wages never were so high; there are no idlers.

"These conditions are certain to last while the war continues. Then will come the great demand from abroad for rebuilding.

"Don't waste time thinking about high prices. Compared with other things, building materials are not high.

"Get that idea in your mind.

"Tell it to the other fellow with money to invest.

"Talk up—not down."

* * *

As to Prices

STUDY of comparative prices current discloses two outstanding facts:

First—Price differences are slight, when allowances are made for general and local conditions, such as distances from source of supply and whether the product is of home manufacture.

Second—The great need of standards of quality, weights and containers.

The accompanying table (from reliable sources) of average prices in various districts of the country will summarize conditions at a glance.

It will be seen, for example, that bulk lime is cheaper in the Central and Southern States than either in the East or in the West. This is due, as is well known, to the fact the great lime-producing districts are in the belt which extends north and south through the Central and Southern States. Greater demand and larger consumption in the East is more than offset by the excess railroad freights to the Western States.

On the other hand, it will be seen Portland cement is higher priced in the Central West and Southern States than either in the East or on the Coast. This is for the reason that cement is a "home product" in almost every section of the country, and demand and supply govern prices almost entirely.

Common brick we find to be cheaper in the Central West than either in the East or the West. This condition is due manifestly to the fact the great clay belt lies largely within these States. The same conditions apply to hollow building tile, both of the shale and fire-clay varieties.

As between cities, the differences are equally easy to account for. For example, common brick sells for $9 in Chicago and for $12.50 in Cleveland. This irregularity is accounted for by the fact the standards in Chicago are much less rigid than in Cleveland and the methods of manufacture are cheaper.

Differences in lime prices between cities, which should show little variation, is due almost entirely to the divergence of standards in barrel measurements. In quotations on Portland cement, great difference appears, when actually it is simply a differential between cloth and paper sacks, each of which may be standard in certain localities. The varying weights which form the standards for plasterboard in different parts of the country are a source of confusion in drawing comparisons of material prices.

The need for standards in all sections is one of the glaring faults of the building supply industry as at present conducted. It is a problem that sooner or later must be attacked with a ruthless hand and equitable bases established, even if some individual districts, and even persons, are "hit" in the process of adjustment.

BUILDING MATERIAL PRICES

	East	Central West	South	Coast
Lime—Bulk, per sack:	50c-90c	40c-70c	40c-60c	60c-$1.00
Portland Cement—Cloth sacks:	60c-70c	60c-80c	50c-80c	50c-60c
Common Brick:	$12.00-$16.00	$9.00-$14.00	$8.00-$14.00	$7.50-$12.50
Hollow Building Tile—4 x 5 x 12:	$75.00-$100.00	$45.00-$75.00	$60.00-$100.00	$50.00-$100.00
Hydrated Lime—Ton, paper sacks:	$15.00-$20.00	$12.00-$19.00	$12.000-$18.00	$15.00-$22.00

Plan Organization of National Association

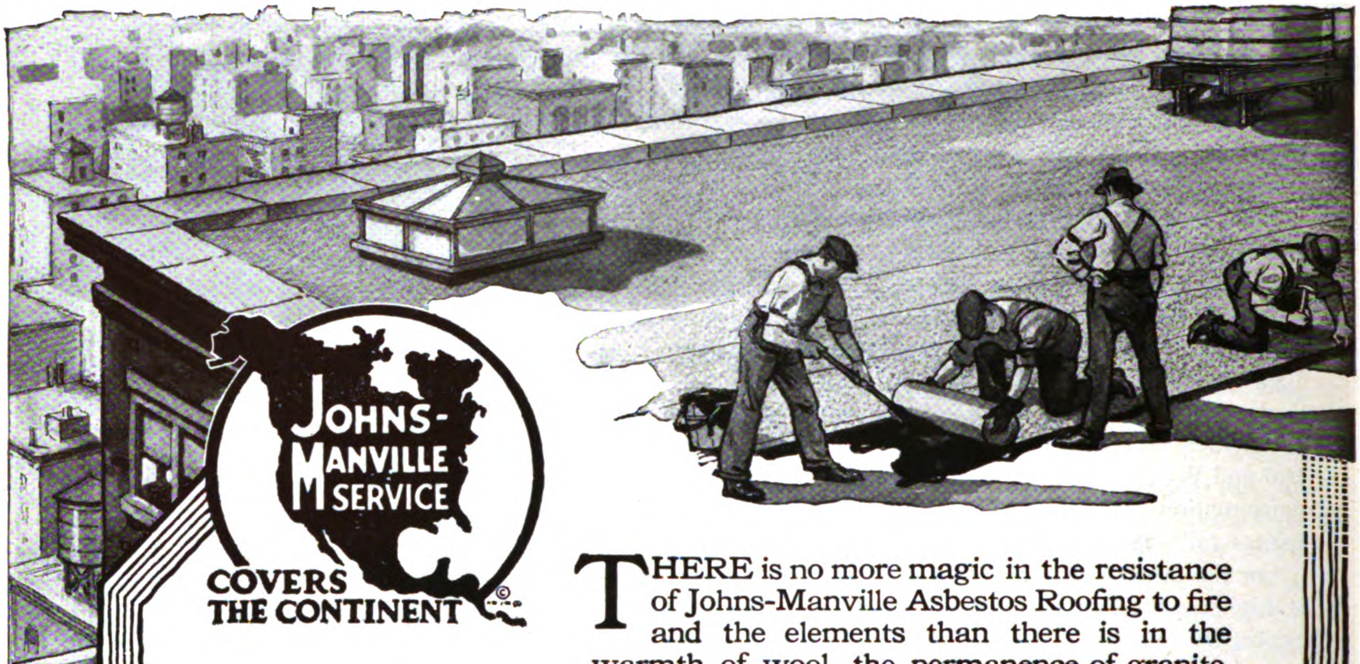
EVOLUTION from a semi-social and deliberative body to a representative, working trade organization is expected to follow a meeting at the Wm. Penn Hotel in Pittsburgh on December 6 of members from all parts of the country of the National Builders' Supply Association.

In the past, this Association has been essentially a non-active body. Its membership is composed largely of individuals scattered in all parts of the United States. Its meetings of necessity were infrequent and the attendance small. Limitations of time at its conventions precluded all but the most generalized consideration of matters effecting its members. Long distances traveled by members almost necessitated "taking the family along." In fact, the greater part of the business in the past has been done in the bars and ballrooms of the convention hotels.

At the Pittsburgh meeting it is proposed to introduce a plan of amplification which will do away with the scheme of individual memberships and substitute the delegate system, which will be representative of smaller district bodies.

In short, it is planned to make it a working organization which aims to do in a national way what many State building supply associations are doing for their members.

JOHNS-MANVILLE ASBESTOS ROOFING



JOHNS-MANVILLE SERVICE
COVERS THE CONTINENT

THERE is no more magic in the resistance of Johns-Manville Asbestos Roofing to fire and the elements than there is in the warmth of wool, the permanence of granite, or in the resistance of rubber to water—it's natural. Every sheet of Johns-Manville Asbestos Roofing is naturally fire-repellent, water-resistant, time defiant, because each fibre of that felt is *naturally* endowed with those properties.

Your roof decision need not be one which asks the question "what kind of a roofing," but "what kind of a Johns-Manville Asbestos Roofing." There is not one negative factor in such a choice. It is the most economical roofing—the safest roofing—a roofing that rarely needs attention.

Is it any wonder that Johns-Manville Asbestos Roofing is fast gaining general acceptance, when an ideal material for roofing can now be had for any roof, as the list below will show?

Asbestos Built-Up Roofing for flat roofs, Asbestos Ready Roofing for sloping surfaces, Corrugated Asbestos Roofing for skeleton framing, Transite Asbestos Shingles for homes.

Johns-Manville Roofing Responsibility—a principle that certifies the service of every Johns-Manville Asbestos Roofing. You can register your roofing with us, and thus be assured of complete satisfaction in the service it gives.

H. W. JOHNS-MANVILLE CO.
NEW YORK CITY
10 Factories—Branches in 55 Large Cities

First National Bank Bldg., Omaha, Neb.
Graham, Burnham & Co., Architects.

WEATHER: Always warm in winter and cool in summer if you are in a firesafe home, office or factory building.

The Fireproofing News

CONTAINING DETAILED DESCRIPTIONS OF NEW DEVICES AND APPLICATIONS OF MATERIALS WHICH ARE OF REAL VALUE IN FIRESAFE BUILDING: ALSO NOTES ON THE LATEST BOOKLETS, CATALOGS AND OTHER FIRESAFE LITERATURE, WITH OTHER ITEMS OF INTEREST TO THE FIREPROOFING FRATERNITY

LATEST EDITION

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New York City, N. Y., October, 1917

Priceless

RAT-PROOF BUILDING

Through Bulletin 896 issued by the Federal Department of Agriculture, property-owners of the country are advised that the best way to keep rats from buildings is to use cement in construction. "As the advantages of this material are coming to be generally understood," says the bulletin, "its use is rapidly extending to all kinds of buildings. The processes of mixing and laying this material require little skill or special knowledge, and workmen of ordinary intelligence can successfully follow the plain directions contained in handbooks of cement construction.

"Many modern public buildings are so constructed that rats cannot find lodgment in the walls or foundations, and yet in a few years, through negligence, such buildings often become infested with the pests. Sometimes drain pipes are left uncovered for hours at a time. Often outer doors, especially those opening on alleys, are left ajar. A common mistake is failure to screen basement windows which must be opened for ventilation. However the intruders are admitted, when once inside they intrench themselves behind furniture or stores and are difficult to dislodge. The addition of inner doors to vestibules is an important precaution against rats. The lower edge of outer doors to public buildings, especially markets, should be reinforced with light metal plates to prevent the animals from gnawing through. Any openings left around water, steam or gas pipes where they go through walls should be closed carefully with concrete to the full depth of the wall."

◆

PHOTOGRAPHS OF TILE WORK

A pictorial prize contest, open to all tile dealers in the United States, is being conducted by the Associated Tile Manufacturers of Beaver Falls, Pa. What is desired is a photograph "in which tile is the principal subject of interest or constitutes the predominating feature. Individual prizes range from $150 for the first award to eighteen of $10 each beyond the sixth. To assist dealers who desire to enter the competition, the association has issued a booklet entitled "Some Suggestions on Photographs of Tile Work," a copy of which may be had upon request.

◆

BRICK CEMENT MORTAR

A new product called "Brixment" has been placed upon the market by the Louisville Cement Company and is being handled through the general sales agency of J. B. Speed & Co., of Louisville, Ky., and Speeds, Ind. "Brixment" is manufactured by a secret process and contains, among other material, both natural and Portland cement. It is reputed to have a very plastic consistency and to be easily and evenly applied by masons.

◆

TO PUSH HOME-OWNING MOVEMENT

Impetus to the "Own Your Home" movement will be given if the National Real Estate Association carry out its present purpose of advertising the idea in a broad way. Subscriptions for the work are being sought from building material manufacturers and others who may reasonably expect increased demand for their products or service as a result of the intended campaign.

◆

TO PROTECT PLASTER FROM CRACKING

"Kornerite," a product the Penn Metal Company, of Boston, has been working upon for some time, will, it is expected, be ready for the market about the first of the new year. An expanded metal mesh, "Kornerite" is designed for use on all interior corners. It will supply an excellent bond for plaster and prevent cracking of the latter, a too frequent cause of complaint in masonry work.

◆

PLAN BOOMING METAL SHINGLES

Awake to the opportunity offered for the use of their product through the growing antagonism to the dangerous wood shingles, manufacturers of metal shingles are planning an aggressive business-getting campaign, and if the idea be properly carried out the net result should be a pronounced increase in the demand for this particular form of roof covering.

Commenting upon the matter, the *Sheet Metal Journal* in a late issue said:

"One city after another in the South and Southwest has decreed by municipal action that the wooden shingle must go and be replaced by fireproof material. These roof changes are not to be made all at once, but gradually, and in the present high prices of metal this fits in with the opportunity of the local sheet metal contractor to educate the property-owner to the fireproof and other qualities of the metal shingle when the wooden shingle must be replaced.

"The time to begin this work is now. The fellow with the other kind of material is not asleep. He sees that hundreds of thousands of dollars' worth of roofing must be used in the next few years in new and replacement work in the cities that have legislated against the wooden shingle. Just as soon as the demand becomes apparent and prices begin to decline (these two will probably come at the same time), the merits of every kind of prepared roof covering and shingle will be exploited without limit. The strength of the fight for this business will not be so much in the merits of the prepared material as the capital back of it and the determination and skill with which it will be used."

CONSTRUCTION view of Regent Hotel Bldg., St. Louis, Mo. Berger's Metal Lumber used thru-out for floors, partitions and roof. This building is a three-story and basement construction—additional floors to be added later.

BERGER

No Depreciation With This Construction

The buildings you erect will be proof against fire, rodents, sound and decay—cracks in walls, and ceilings will be prevented—maintenance expense reduced—insurance cost lowered—by using Berger's

Metal Lumber

This pressed steel construction gives positive assurance of strength, safety and permanency. Depreciation in value can be forgotten. Easy to erect—no costly delays—as each member is accurately cut at the factory, in accordance with your plans, and reaches the building ready for placing. Rigid supervision unnecessary. While exceptionally strong, Berger's Metal Lumber is lighter in weight than any other fireproof construction, greatly reducing dead load in a building and saving in the cost of beams, girders, columns, etc.

Use this material for the floors, roofs and partitions in any size or type of building.

The Berger Mfg. Company, Canton, O.

Branches: St. Louis Boston New York
Philadelphia Chicago Minneapolis
San Francisco

Bulletin 12 C contains complete technical information on Berger's Metal Lumber. Send for a copy.

CENTURY-OLD LANDMARKS

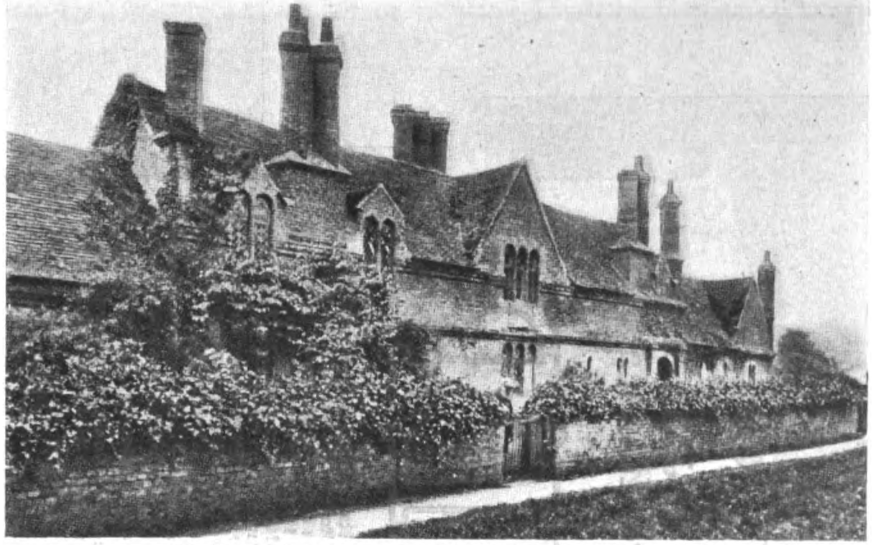
Upon the opposite page appears views of three European homes which have been standing for centuries and yet offer no evidences of decay. Readers of CONSTRVCTION will be interested in learning the following particulars concerning these picturesque structures:

The "Abbey" at Audley End, Staffordshire, England, built in 1607, is an agreeable example of the low rambling English type of house. The effect of length is accentuated by the corbelled lines of the slight overhanging above the ground floor, the sharply defined horizontal lines of the cornice plainly visible beneath the scanty eaves and by the close proximity of the garden wall, which materially increase the horizontal emphasis. As may be seen by the position of the second floor windows in relation to those of the floor below and by the wide chimney breasts, the ceiling heights of the rooms beneath the roof are not seriously affected by the slope at the eaves. The pitch of the roof is ideal and shows the century-old Wales slate to good advantage. The slate have been upon the roof 310 years. It, together with the brick and stone, makes this dignified structure absolutely fireproof. Many of the more modern homes of the real country gentlemen are "Americanized" and patterned after the Old English models.

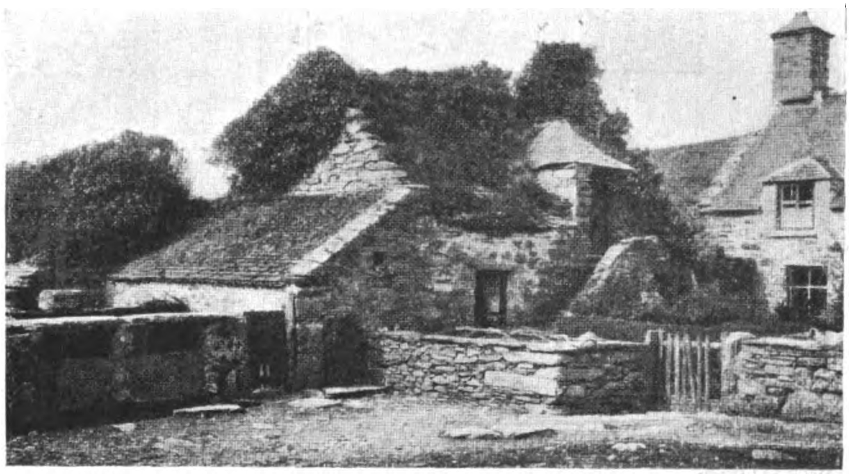
The house at Plaxtol, Kent, England, was built in 1610. The Englishman loves gables, irregular plans and broken surfaces upon his home buildings. In this irregular-shaped residence is truly exemplified a taste peculiar to the seventeenth century. Comfort, concerning floor plans, must have been seriously considered. Native stone and slate from Wales were utilized to good advantage. The roof of this home of character suggests Wadsworth's lines, written many years ago: "To the solid rock of nature trusts the mind that builds for age." Ruskin says in his inimitable way, "Tree and clouds and rivers are enjoyable even by the careless, but the 'Rock of Ages' under his foot has for carelessness and dignity, and there is bread for thought in it more than is any lowly feature in the landscape. For a stone when it is examined will be found a mountain in minature." The slate on this house is well preserved, and, while it has been doing good service for over 300 years, there is no reason why it will not so continue. The interior of the home has been remodeled several times and the outside "pointed up" when necessary. In making an inspection in the attic there is no evidence that the original roof boards or rafters have been disturbed. The slate is laid with three-inch lap.

Built in the fifteenth century, the Italian house on the Strads Choda,

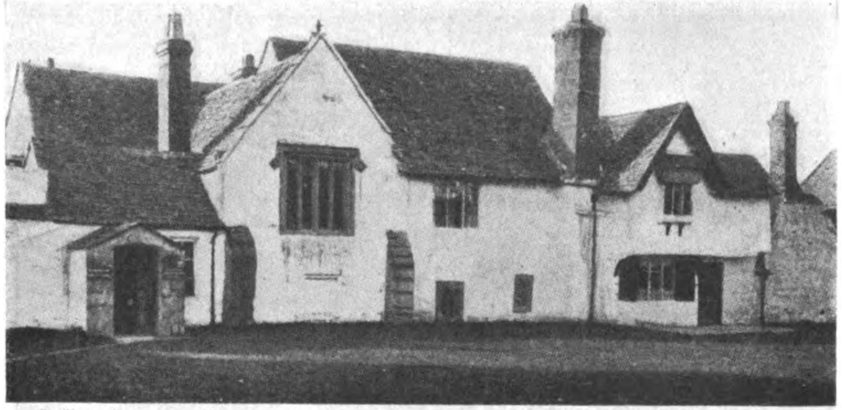
(*Concluded on page* 175)



The "Abbey" at Audley End, Staffordshire. Built in 1607.

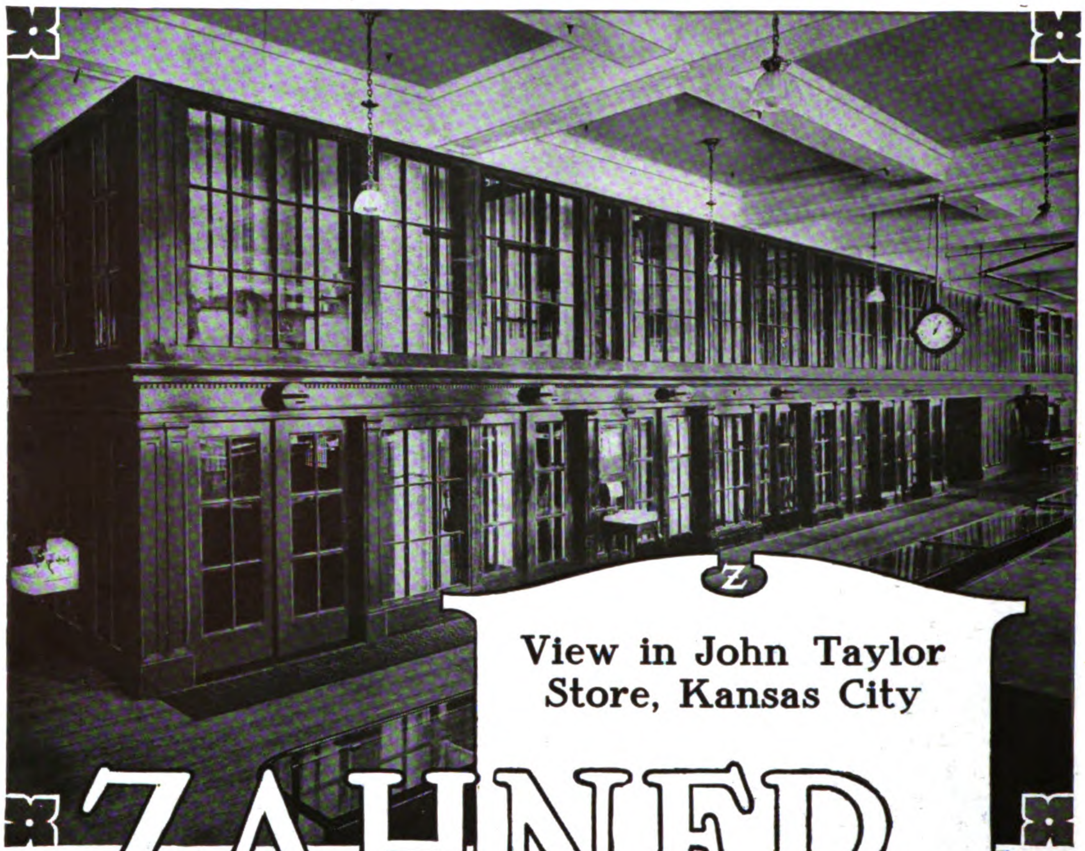


House at Plaxtol, Kent, England. Built in 1610.



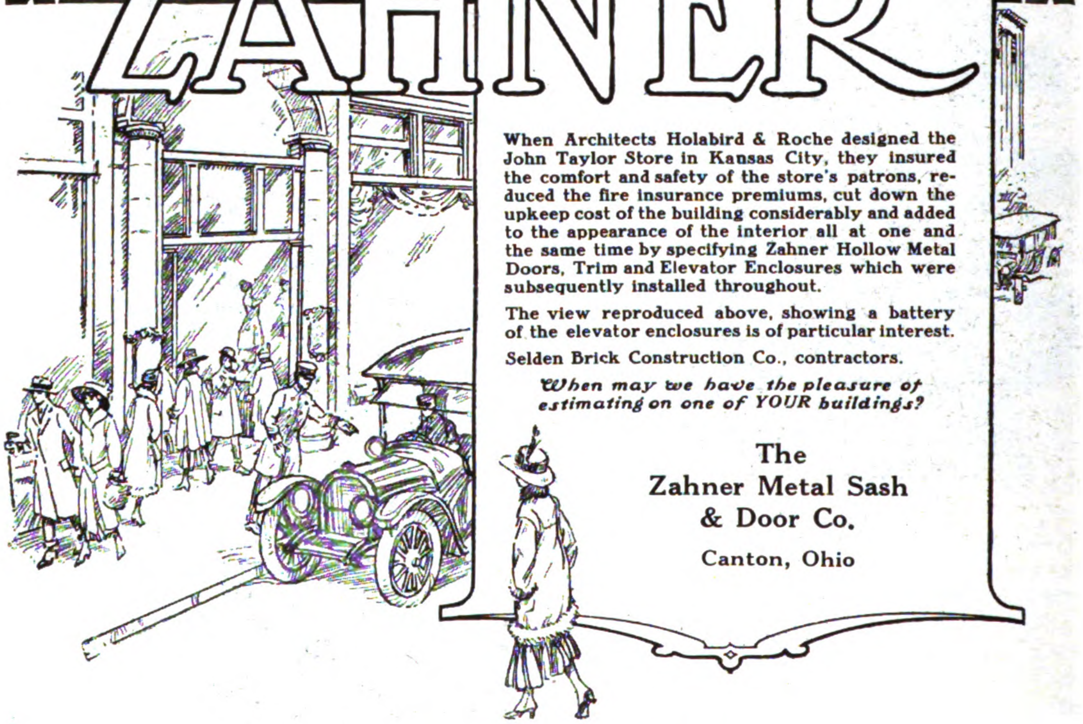
Italian House on The Strada Choda, Near Verona. Built in the Fifteenth Century.

THE WEARING AS WELL AS THE ARTISTIC QUALITIES OF SLATE AS A ROOF COVERING STRIKINGLY SHOWN BY THE ABOVE ANCIENT BUILDINGS



View in John Taylor Store, Kansas City

ZAHNER



When Architects Holabird & Roche designed the John Taylor Store in Kansas City, they insured the comfort and safety of the store's patrons, reduced the fire insurance premiums, cut down the upkeep cost of the building considerably and added to the appearance of the interior all at one and the same time by specifying Zahner Hollow Metal Doors, Trim and Elevator Enclosures which were subsequently installed throughout.

The view reproduced above, showing a battery of the elevator enclosures is of particular interest.

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CENTURY OLD LANDMARKS

(*Continued from page 172*)

near Verona, is also well preserved, the slate roof being in an unusually serviceable condition. These slate must have been imported from Wales, as their color and texture would so indicate that. The weathering effect of these "aristocrats" of roofing material is most charming, showing grays, greens and browns. Jeffery has expressed charmingly his appreciation of this study of Nature's roofing slate product, "Stone walls are not left without a fringe on the hardest; on slate's stone crop takes hold and becomes a cushion of grays, greens and brownish bloom." Nature is thus a minature painter and handles a delicate brush, the tip of which touches the tiniest spot and leaves something living. The main structure is of stone and portions covered with plaster, and one side having been whitewashed many times. The west wing has been restored two or three times, as nearly as can be learned.

The plant of the Clymer Brick & Fire Clay Company, of Indiana, Pa., has been secured by Hiram Swart's Sons, Inc., of Johnstown, thereby securing to the latter properties at Johnstown, Ia., and Clymer.

◆

With a capital of $100,000, the Washington Porcelain Company has been formed at Washington, N. J., for the purpose of manufacturing clay products.

◆

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912,
of CONSTRVCTION, published monthly at New York, for October 1, 1917.
State of New York, County of New York, ss.

Before me, a Notary Public in and for the State and county aforesaid, personally appeared G. A. Watson, who, having been duly sworn according to law, deposes and says that he is the General Manager of CONSTRVCTION, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 443, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business manager are:

Publisher—Constrvction Publishing Company, 18 E. Forty-first street, New York City.

Managing Editor—None.

Editor—S. G. Webb, 18 E. Forty-first street, New York City.

Business Managers—G. H. Stewart, 18 E. Forty-first street, New York City.

2. That the owners are: (Give names and addresses of individual owners, or, if a corporation, give its name and the names and addresses of stockholders owning 1 per cent or more of the total amount of stock). G. A. Watson, Cranford, N. J.; L. C. Watson, Cranford, N. J.; G. H. Stewart, 911 E. 176th street, New York City.

3. That the known bondholders, mortgagees and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company, but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the six months preceding the date shown above is—. (This information is required from daily publications only.)

G. A. WATSON, General Manager.

Sworn to and subscribed before me this 15th day of October, 1917.

(Seal) WM. J. SMITH.

(My commission expires March 30, 1919.)

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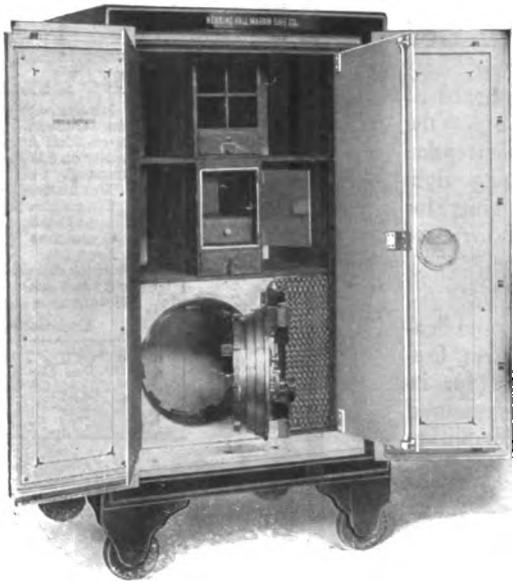

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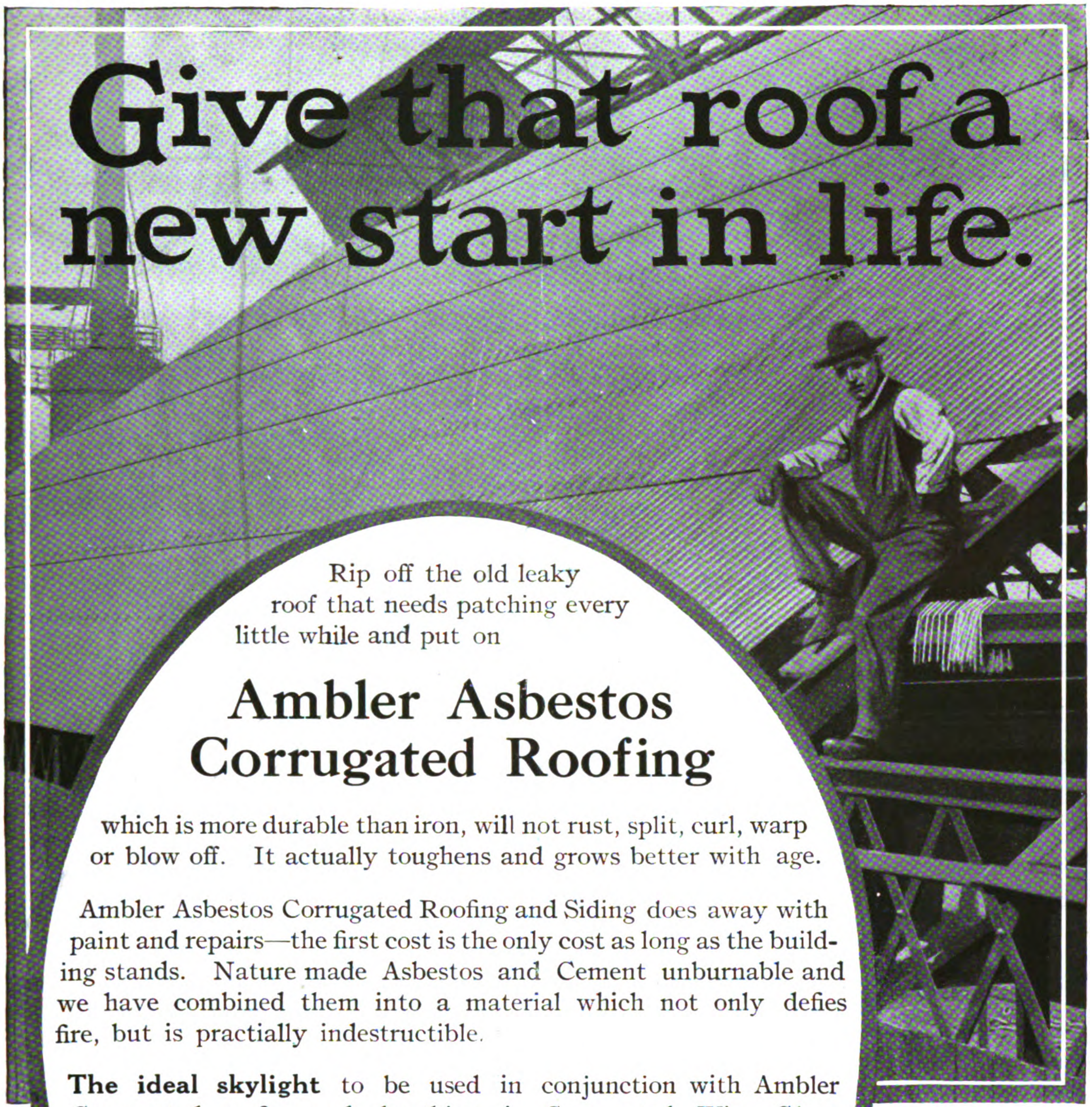

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View in John Taylor Store, Kansas City

ZAHNER

When Architects Holabird & Roche designed the John Taylor Store in Kansas City, they insured the comfort and safety of the store's patrons, reduced the fire insurance premiums, cut down the upkeep cost of the building considerably and added to the appearance of the interior all at one and the same time by specifying Zahner Hollow Metal Doors, Trim and Elevator Enclosures which were subsequently installed throughout.

The view reproduced above, showing a battery of the elevator enclosures is of particular interest.

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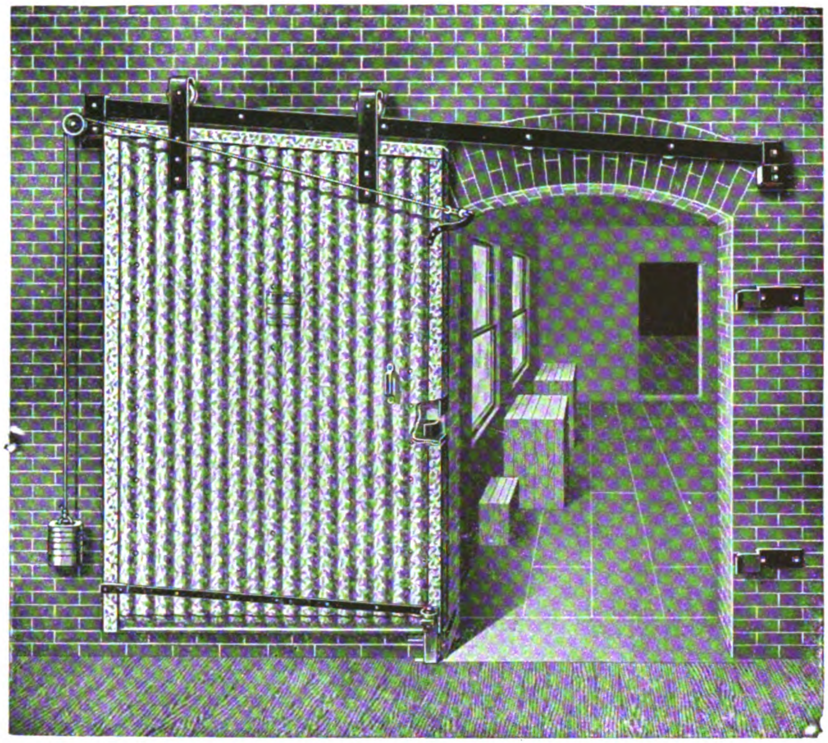

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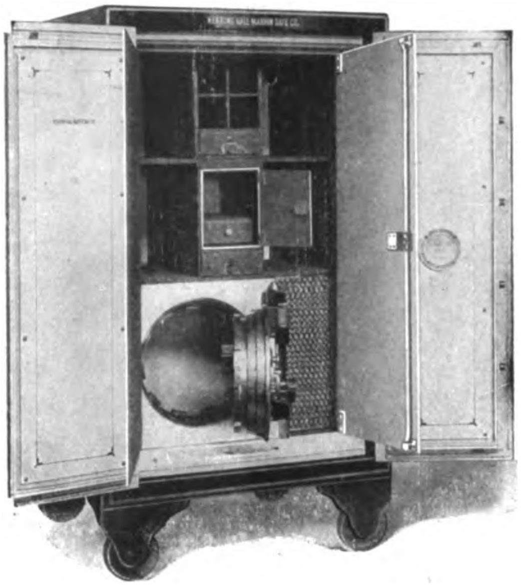

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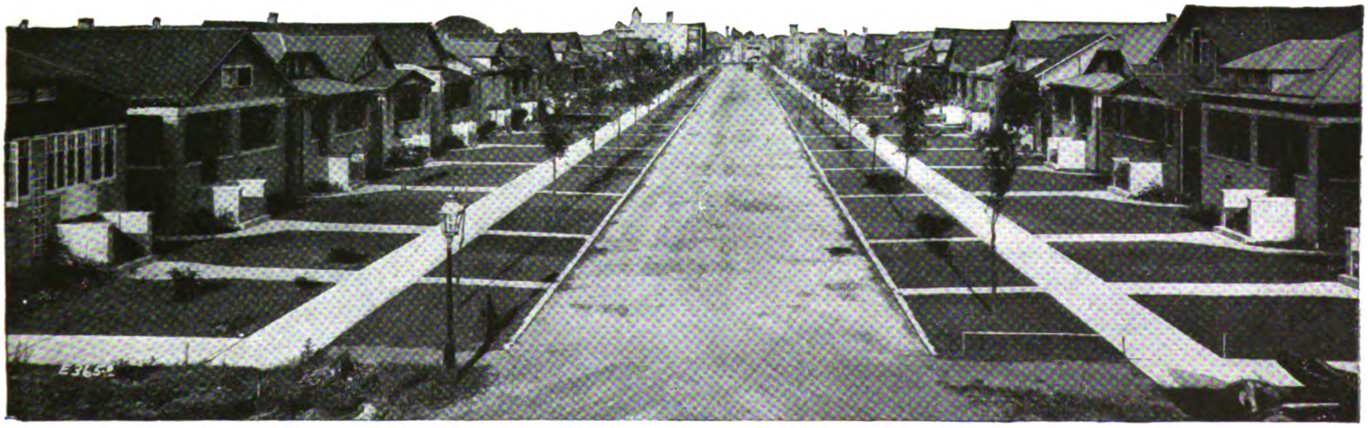

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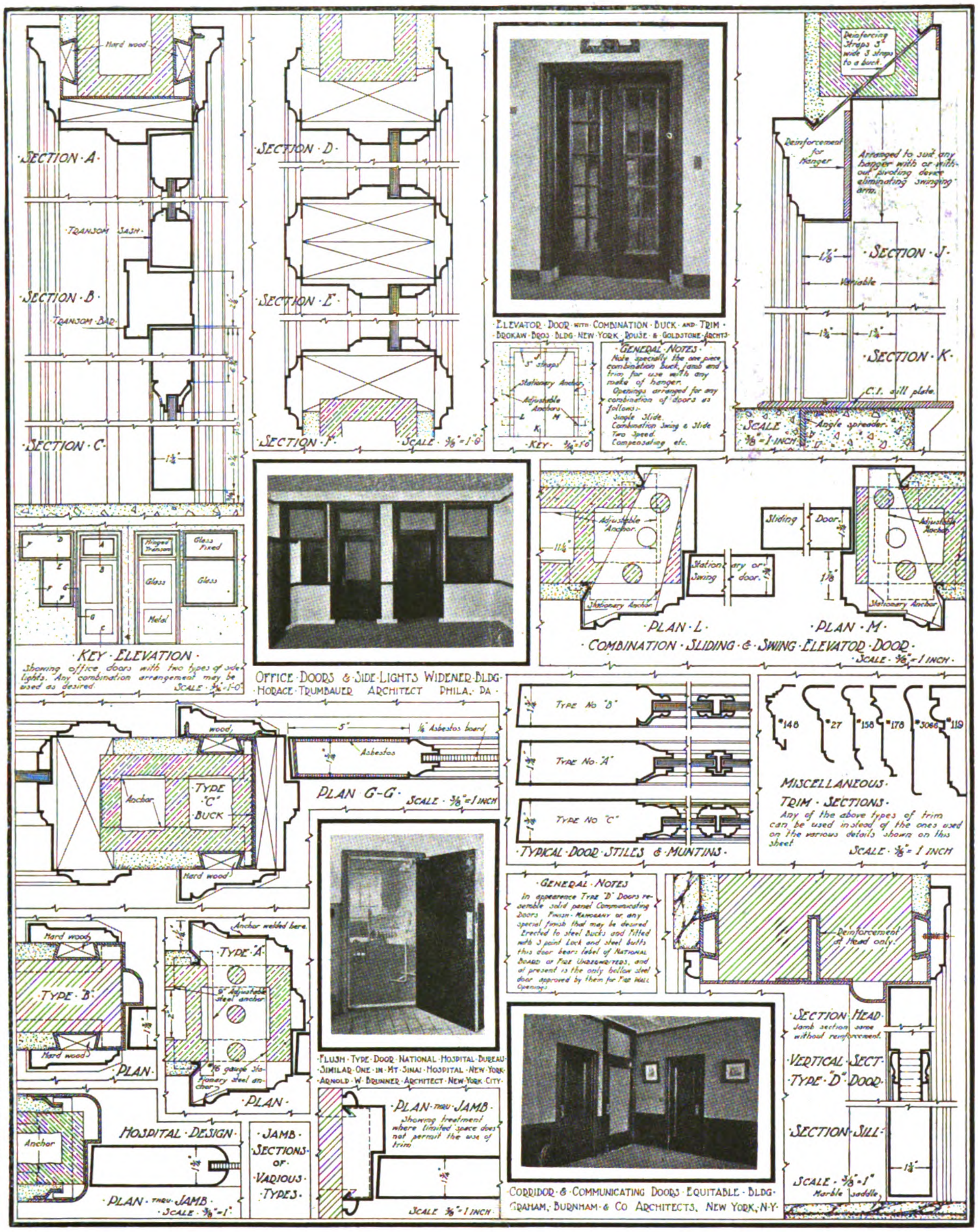

·ELEVATOR·DOOR·WITH·COMBINATION·BUCK·AND·TRIM·
·BROKAW·BROS·BLDG·NEW·YORK·ROUSE·&·GOLDSTONE·ARCHTS·

·GENERAL·NOTES·
Note specially the one piece combination buck, jamb and trim for use with any make of hanger.
Openings arranged for any combination of doors as follows:–
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Combination Swing & Slide
Two Speed.
Compensating etc.

·KEY·ELEVATION·
Showing office doors with two types of side lights. Any combination arrangement may be used as desired. SCALE·3/16"=1'-0"

OFFICE·DOORS·&·SIDE·LIGHTS WIDENER·BLDG·
·HORACE·TRUMBAUER ARCHITECT PHILA.·PA·

MISCELLANEOUS·
TRIM·SECTIONS·
Any of the above types of trim can be used instead of the ones used on the various details shown on this sheet.
SCALE·⅜"=1 INCH

·GENERAL·NOTES
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·JAMB·SECTIONS·OF·VARIOUS·TYPES·

·PLAN·THRU·JAMB·
Showing treatment where limited space does not permit the use of trim.
SCALE ⅜"=1 INCH·

CORRIDOR·&·COMMUNICATING DOORS·EQUITABLE·BLDG·
GRAHAM, BURNHAM·&·CO ARCHITECTS, NEW YORK, N·Y·

Jamb section same without reinforcement.

·EMPIRE·ART·METAL·COMPANY·

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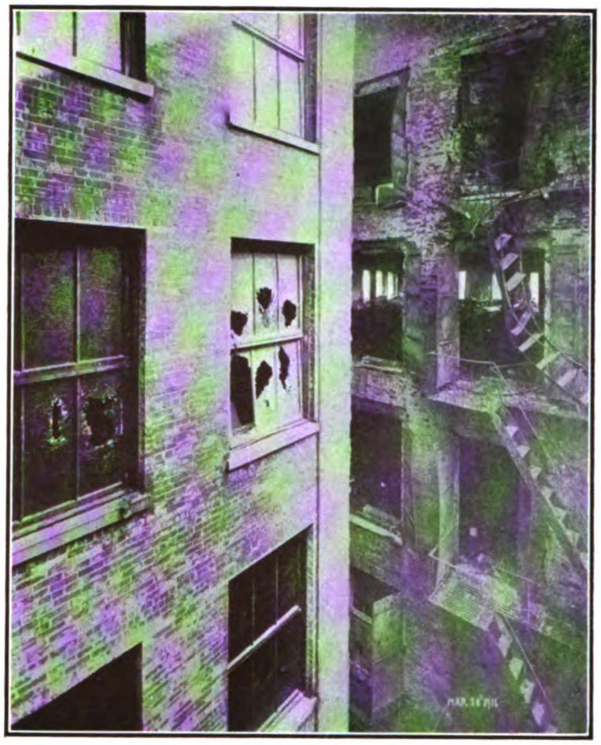

Note the holes punched in the "Wire Glass" windows by the firemen to enable them to fight the fire in the Asch Building from the interior of the adjacent fireproof building, the "Wire Glass" windows acting as a fire shield.

THIS age or Fireproof Construction compels us to be familiar with materials which are approved Fire Retardants.

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CONSTRVCTION
ADVOCATING THE CONSISTENT VSE OF
FIREPROOFING MATERIALS & PROTECTIVE DEVICES

VOL. V NOVEMBER, 1917 No. 5

Would Abolish Shingle Roofs at Kansas City, Mo.

AFTER several months of preparation, the new building code proposed for Kansas City, Mo., is before the Council for review, and, it is hoped, for favorable action.

Notable among the suggested reforms is the prohibition of the further use of the dangerous wood shingle roof in a large part of the residential section of the community and the insistence that if existing wooden roofs be damaged to 50 per cent of their total area they shall be replaced with a covering of incombustible material.

While fire underwriters, appreciating as they well do the serious fire menace of wooden shingles, heartily favor the proposed new ordinance, the lumbermen, as usual, are found strongly and aggressively arrayed in opposition and have succeeded in allying to their aid the real estate interest, using as a means for compelling such an unholy alliance the time-worn and highly specious plea that prohibition of wood shingle roofing seriously retards building operations.

So successfully has this cry been raised that the committee charged with the code revision was compelled to modify their initial ordinance draft prohibiting the use of wood shingles anywhere in the city limits to certain residential areas.

But even this concession does not satisfy the opposition, which, spurred on by the lumbermen, who are thoroughly alarmed over the widespread and ever-growing sentiment against the continued use of their product in roof covering, are demanding nothing less than the defeat of the entire recommended statute.

Nashville, Tenn., is within easy reach of Kansas City, while Atlanta and Augusta, Ga., and Paris, Tex., are not so distant but what they could be easily reached and the opinion of their respective municipal authorities had as to the community menace of wood shingle roofs.

Each of the cities named has, within the past twelve months, sustained losses aggregating millions of dollars through conflagrations directly traceable to this hazard, and the strong prohibition which each in turn adopted against the further use of the dangerous wood shingle was the direct outcome of costly experience.

Kansas City is a thoroughly wide-awake community and contains within its corporate limits many industries of first rank. If its present prosperity and future development is not to be seriously retarded, those charged with safeguarding the public weal should promptly and emphatically adopt the proposed ordinances, and to aid in attaining such eminently desirable result it is clearly up to the manufacturers of firesafe building material to lend every aid to the insurance men and other clear-visioned citizens who are striving to protect Kansas City against one of the most serious fire dangers threatening it.

Firesafe Buildings for Farmers

IF firesafe buildings are desirable in large centers of population, where prompt and efficient fire-fighting facilities are usually close at hand, they are absolutely indespensable upon the farms which are generally beyond the limits of public protection, and when the men who might be counted upon for help in emergencies are usually at work long distances from the home structures.

The need for a more secure type of buildings upon the farm was set forth in the following editorial culled from a late issue of *The Country Gentleman*:

"Only fireproof buildings are permitted in most European cities. This has been the custom and law over there for generations, but we have only recently begun to build with a view to fire resistance. The city of Macon, Ga., taking a lesson from the Atlanta fire, has passed an ordinance providing that all new houses shall have fireproof roofs, and that within twelve years all old houses shall have been remolded to have a roof of fireproof material.

"The insurance companies have been discussing the wood-shingle-roof problem for a long time. They have sought to lead builders of all classes to recognize it as a hazard that should be wiped out. While ordinances can be made effective in cities, houses in the open country can be reached effectively by the insurance companies only through the fixing of an increased premium rate on buildings that are not fireproof.

"Modern farm building construction is tending rapidly toward fireproof requirements. Those dwellings and barns built of concrete, hollow tile, stucco and kindred masonry products, are much safer than the old ones of frame with wood shingle roofs. But in too many cases the fireproofing has stopped at the eaves and the building has been roofed with a tinder box of inflammable wood shingle.

"Building for permanence falls short of its purpose if a firesafe roofing is neglected."

To all of the above CONSTRVCTION adds a hearty "Amen"; and the character of material advocated for house building is equally desirable for barn and other outhouse construction. In the great majority of cases out-buildings upon farms are located so close to the house as to constitute practically one fire risk, and it is most important that all structures be built of and covered with fire-resistive material.

The farmers offer a splendid field for cultivation by manufacturers of firesafe building products, and they should give it constant and close attention.

Sprinklers for Cotton Seed Oil Mills

OWNERS of cotton seed oil mills have been strongly advised by the South-Eastern Underwriters Association, which has supervision over fire insurance interests in a large section of the South, to protect their entire properties with automatic sprinklers and to build standard firewalls in the seed and hull houses to overcome the unusual fire hazard inseparable from such risks.

The letter of the underwriting body reads in part as follows:

"We have to advise that the rating of your property will no longer be handled by the sprinklered risk department of this association. We are taking this opportunity of calling this to your attention, so that you will be fully informed as to the reasons for such action.

"We have found in all cases that where the seed and hull houses are not equipped with sprinklers that the fire losses have been very heavy; in fact, so severe that our members do not consider oil mills where the oil mill portion only is equipped with automatic sprinklers as a protected risk, and therefore it seems necessary that the underwriting be handled hereafter through the general departments of the companies, rather than through their sprinklered risk departments.

"During the operating season 70 per cent or more of the values of an oil mill are located in the seed house, and our records show that when a seed house once catches fire it is generally a total loss. For several years on these unsprinklered portions of oil mill plants our members have sustained losses far in excess of the premium income. The association has, as a result, decided that it is necessary not to hereafter rate oil mills on a sprinklered basis in whole or in part unless the entire property is equipped with a standard automatic sprinkler system.

"We are giving you this information now so that you may consider extending your sprinkler equipment throughout your seed and hull houses before another operating season, and we further suggest that the seed and hull houses be subdivided into fire divisions by standard firewalls, so as to cut down the percentage of values subject to one fire as far as is possible."

Theatre Construction in New York City

SEVERAL interpretations of the Building Code of New York City, applicable to theatre construction, were recently made by the Board of Appeals.

In granting an appeal in connection with a new theatre, it was held that, under the provisions of Sec. 70, Building Code, a building constructed separately, although connected with a theatre by door openings equipped with fire doors, is a separate building, and that if such part of the building which is used in connection with the theatre is constructed fireproof and wholly separated from the rest of the building by fireproof construction, the rest of the building, when used for business purposes, may be of non-fireproof construction if the entire building does not exceed in height and area the limits fixed by the Building Code for non-fireproof business buildings.

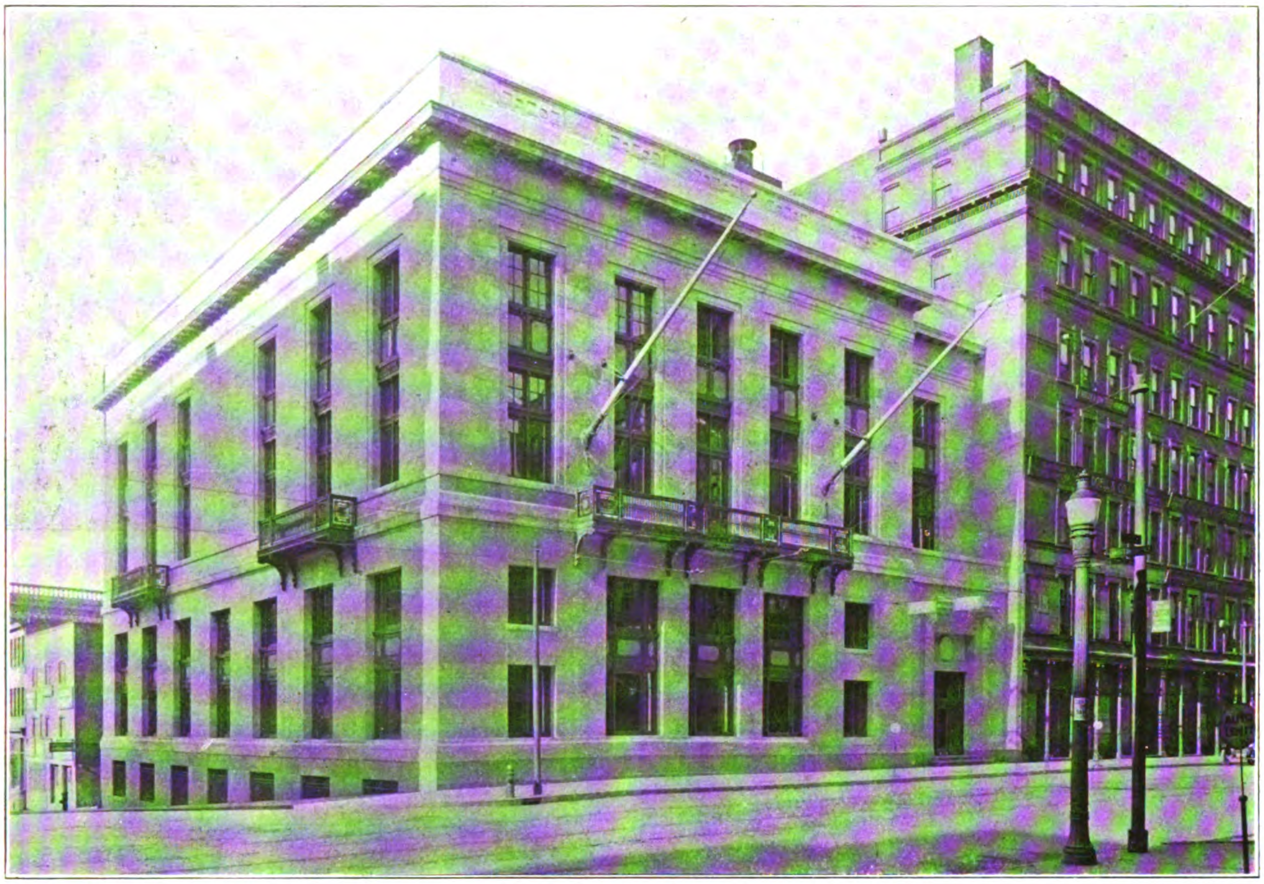
Must Consider the Human Element

"THERE is needed among the technical men who plan buildings in which people congregate"—to quote from "Fire Prevention Study," by the Alumnæ of Bryn Mawr College—"a deep realization that their task is not complete, nor even well done, when the creation of their minds serves perfectly the purposes of commercial and industrial utility, or beauty, or both; but omits any detail which will insure safety to the lives which the building is designed to hold."

SPRINGFIELD, ILL., has joined the lengthening number of municipalities prohibiting the further use within their respective corporate limits of the dangerous wooden shingles for roof coverings.

Attractive, Convenient and Thoroughly Firesafe

AMONG the business associations of the country alive to the economic drain of the annual fire waste and alert in championing measures for reducing it, none has been more conspicuous than the Chamber of Commerce of Rochester, an organization composed of the leaders in the industrial and commercial life of the Flour City, who seem constantly alert to advance not alone local interests, but whatever affects the good of the nation as well.



Claude Bragdon, Foster and Gade, } Associate Architects New Chamber of Commerce Building, Rochester, N. Y.

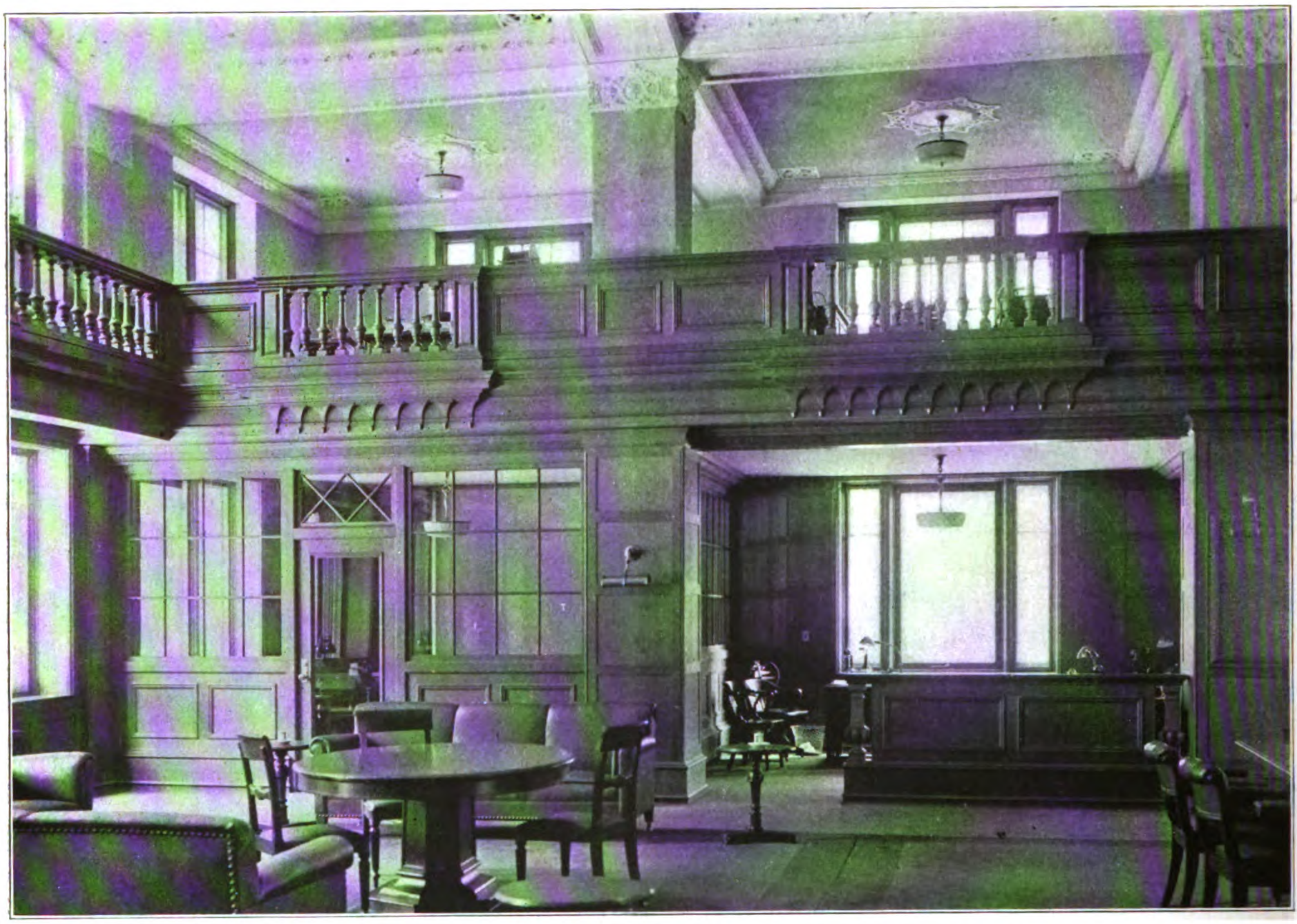
It was thoroughly consistent, therefore, that when erecting a new home from which to direct its numerous activities the Rochester Chamber of Commerce should have built a structure that is not only artistic and very conveniently arranged and furnished, the greatest care should have been exercised to make it as safe from the fire menace as human ingenuity could devise.

The building establishes a new type, which, in all probability, will be widely followed.

Its peculiarity consists in the fact that, instead of a number of rooms, each devoted to a different function, there is one large room in which all of the activities of the organization—business, social, gastronomic—go on simultaneously. Above this Chamber Room, so called, there is another of equal size for public dinners, lectures and other civic functions. These two rooms and their appendages constitute practically the entire building, aside from a well-appointed kitchen in the basement and a pent house to accommodate the ventilating system on the roof.

In materials, method of construction and equipment, the Chamber of Commerce structure represents the very latest and best practice. The exterior is of granite, Tennessee marble and bronze—noble materials, to which time is not hostile but kind, since their appearance improves with age.

The interior main halls are entirely lined with Botticino marble and floored with Tennessee marble. The two great rooms are wainscoted in quartered oak, floored with cork tile, and the walls of the assembly room are covered with Akoustolith stone, invented by Professor Sabine, with a view to its acoustic qualities. The assembly room is marvelously successful from this point of view, as well as from every other, for,



East End of Chamber Room, Chamber of Commerce Building, Rochester, N. Y.
Claude Bragdon, Foster and Gade, Associate Architects

although it seats a thousand people at dinner, a speaker can easily be heard in every part without raising his voice above an ordinary conversational tone.

The doors and jambs throughout are of metal; the walls of the kitchen are lined with enameled brick, while the toilet rooms are wainscoted with structural glass and floored with tile.

Structurally, the building embodies sensible features. Its steel frame is completely covered and protected by concrete and hollow tile. The walls generally are of brick and the floor arches are of reinforced concrete. The plaster ceilings are suspended from the arches, and the elaborate system of ventilation utilizes the space intervening between the ceilings and floors. The necessity for ample openings in these ceilings has been utilized in a successful way in the plaster decoration of these ceilings. All of the stairways are either of marble or of iron with cork safety treads. A sprinkler system extends throughout the entire building, with the exception of the two big rooms.

The Independence Inspection Bureau of Philadelphia was called in for consultation while the plans were being prepared and all of its recommendations followed, with a view to making this one of the safest as well as one of the most convenient and architecturally beautiful buildings in the country.

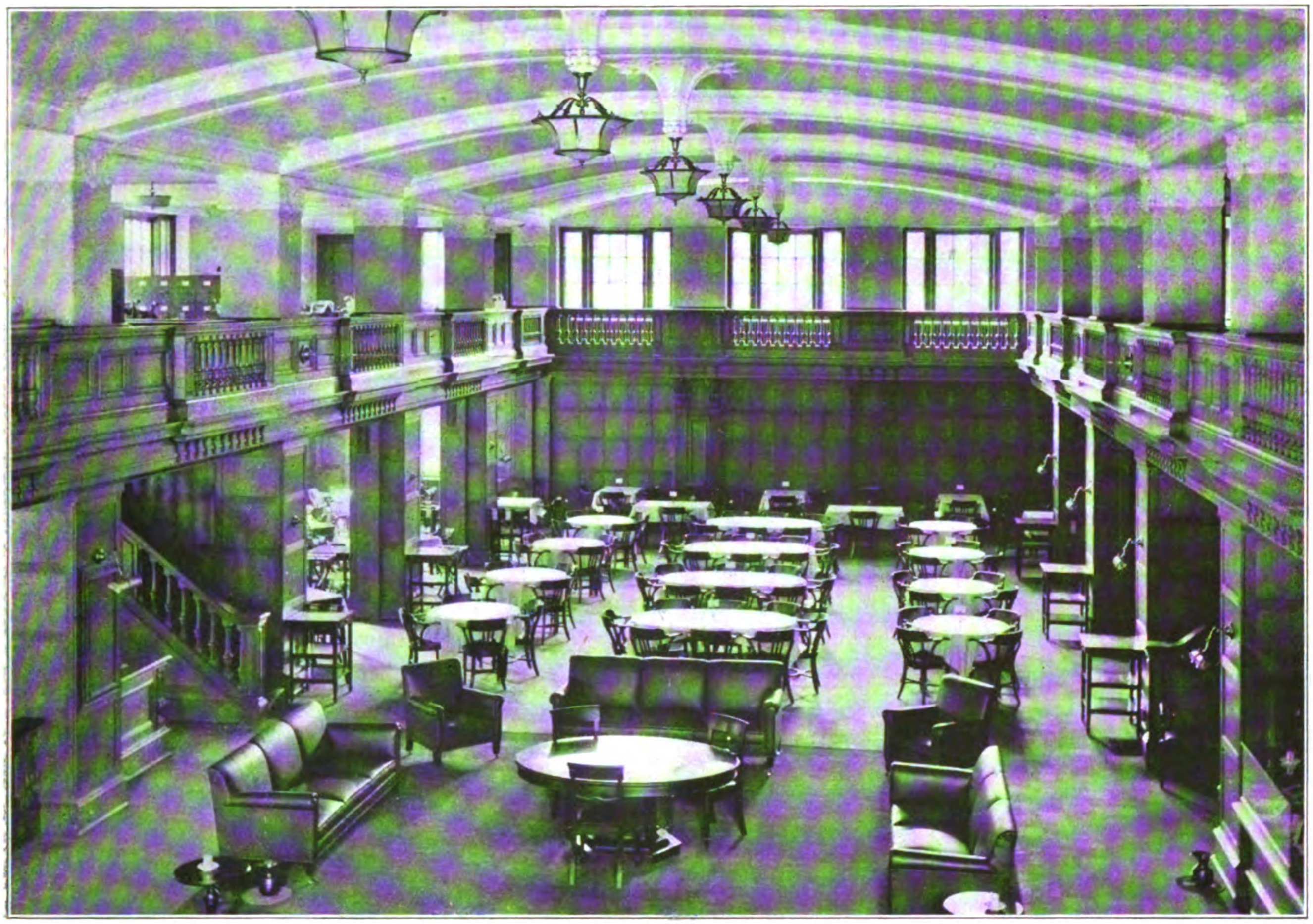
The architects were Claude Bragdon, of Rochester, and Foster and Gade, of New York city. Mr. Bragdon was also the architect of the New York Central passenger station at Rochester.

Tile Roofing Manufacturers to Organize

FEELING the need for co-operative effort to advance their general interests, manufacturers of concrete roofing tile plan an organization for that purpose. The subject will be gone into thoroughly at a gathering of leaders in the business to be held in Buffalo on January 31 and February 1.

As expressed by President W. H. Crume, of the Crume Brick Company of Dayton, Ohio, a leader in the organization movement:

"Recently to get this matter in some tangible shape, I wrote several of the tile manufacturers, and they joined with us in sending out a call for a meeting of concrete tile manufacturers for the purpose of organizing such an organization. The object of it will be to promote the interest of all the members."



General View of Chamber Room (West End), Chamber of Commerce Building, Rochester, N. Y.
Claude Bragdon, Foster and Gade, Associate Architects

Standard Steam Boilers Now

AN economic movement of great importance in view of present industrial conditions in this country is noted in the recent adoption of standard boiler construction rules by New York State. Aside from the obvious advantage of regulation of boiler construction fom the standpoint of safety, the resulting uniformity of manufacture will appeal to the public, particularly in these times of industrial stress, by establishment of the standard power boiler which can be procured from any boiler maker with a minimum of difficulty and expense.

The idea of "standardization" is strictly American. The standard electric socket, standard berry basket, standard firehose coupling, standard cement specification, standard structural steel shapes, standard screw threads, standard gasolene, and, of late, the standard ship and aeroplane motor, are all of American origin. Now the problem of boiler standardization has been attacked, and it has been successful to the extent that in company with eight other of the more progressive States of the Union, New York State is to have all steam boilers in factories, mines, tunnels and quarries standardized in order to provide for their safety in operation. The boiler standard that has been formulated by a Committee of the American Society of Mechanical Engineers, known as the A. S. M. E. boiler code, has been adopted by New York State and is now effective.

The State Industrial Commission recently issued its code for boiler construction as Bulletin No. 14 of the Bureau of Industrial Codes, which has its headquarters at 230 Fifth Avenue, New York city. The rules contained in this bulletin were adopted by the State Industrial Commission in accordance with the requirements of Sections 51a and 52 of the Labor Law.

It is stated in the opening pages of the new code that Rules 800-821 and Paragraphs 378-409 became effective July 1, 1917; Paragraphs 1-377 and 410-430 become effective January 1, 1918. The actual rules for boiler construction given in the code under Paragraphs 1-430 are those which have been formulated by the boiler code committee of the American Society of Mechanical Engineers.

The movement for boiler standardization had its inception in Massachusetts in 1907, where the country first found a leader in the person of John A. Stevens of Lowell, Mass.

Revised Building Ordinance at Portland, Ore.

THROUGH the courtesy of A. L. Barbur, Commissionissioner of Public Works, Portland, Ore., we have received a copy of the ordinance regulating the construction of fire-resistive buildings adopted for the city on September 15th, modifying the former statute. As amended, the ordinance now reads:

"Section 1. That Section 522 of Ordinance No. 21455, entitled 'An ordinance regulating the construction, erection, enlargement, raising, alteration, repair and use of buildings, and to provide for protection against fire, and providing a penalty for the violation of the same,' approved by the Mayor, June 24, 1910, as amended by Ordinance No. 25227, entitled 'An ordinance to amend Sections 80, 105, 151, 154, 304, 305, 312, 340, 359, 360, 364, 365, 370, 372, 373, 384, 387, 374, 400, 469, 501, 511, 522, 526, 702, 704, 715 and 724 of Ordinance No. 21455, entitled 'An ordinance regulating the construction, erection, enlargement, raising, alteration, repair and use of buildings and to provide for protection against fire, and providing a penalty for the violation of the same,' approved by the Mayor, June 24, 1910, approved by the Mayor, May 14, 1912, as amended by Ordinance No. 31166, entitled 'An Ordinance to amend Section 522, covering the construction and alteration of buildings in the fire limits, of Ordinance No. 21455, known as the Building Code,' passed by the Council, November 24, 1915, and approved by the Mayor, be and the same is hereby amended to read as follows:

Buildings Within Fire Limits

"Section 522. Every building hereafter erected or altered within the fire limits shall be of I, II, III, IV, V, or VI Class, except as otherwise provided under this title. The provisions in this title shall apply to buildings and structures, whether temporary or permanent, within the fire limits, as the said fire limits now are or may hereafter be established. Every building erected or altered hereafter, within the inner district, shall be of I, II, or III Class of construction (see Section 732); provided, however, that buildings of V Class of construction not over four (4) stories or sixty (60) feet in height may be erected or altered in the inner district when they conform to the following provisions in addition to or in place of other requirements for this class of construction in the Building Code: All posts, except those carrying the roof only, shall have iron caps; the minimum sectional area of beams shall be sixty (60) square inches; the minimum spacing of beams on centers shall be six (6) feet; anchors of ⅜-inch by 1½-inch wrought iron securely fixed in masonry walls and attached to construction by two spikes of not less than ¼-inch diameter shall be used as specified in Section 308; ordinary partitions may be as specified in Sections 360 and 365, except that incombustible stud partitions will not be permitted; the surface of timber construction, including wood partitions, may be enclosed or covered with wood sheathing or plaster or metal lath or plaster board, provided same follows the contour of the construction, with no air spaces, but said surface shall be planed smooth if exposed; wood sheathing shall not be used on masonry walls; varnish or shellac shall not be used on the structure of the building nor on the finish, except on standing finish; a level ceiling of plaster on metal lath and furring may be hung under the roof or a VI Class roof may be used, provided it is supported by a level ceiling constructed of the materials and strength required for V Class roofs; all openings in exterior walls, except those fronting on a street or court 30 feet or more in width, shall be protected by standard fire doors or shutters (see Section 716), or windows with metal frames and wired glass (see Section 718); an automatic sprinkler system of a type approved by the National Board of Fire Underwriters, or its equal in fire protective value, shall be installed and maintained in complete working condition throughout all parts of the building, and shall be connected with the city water mains.

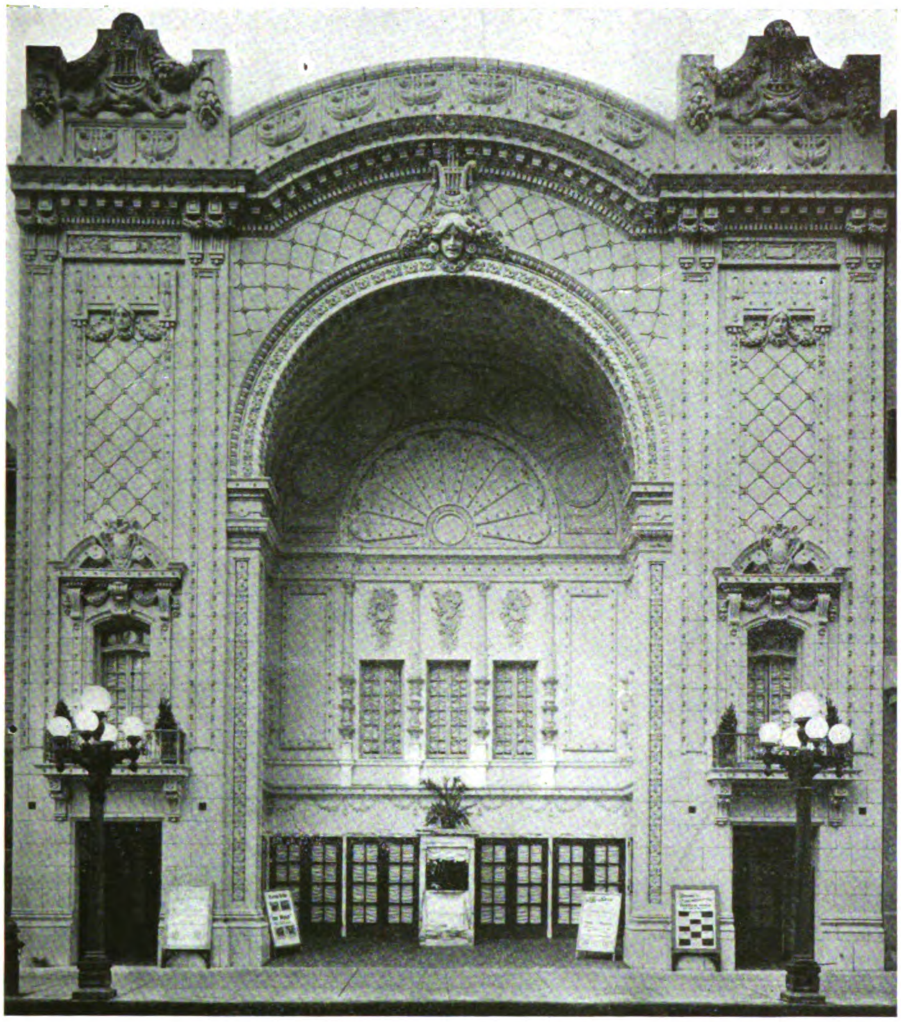
Alterations Defined

"Within the meaning of this section, the word 'altered' shall not be construed to include any change which does not produce an increase in floor area, or which does not materially increase the amount of combustible material, except as further provided in this section. A balcony of mill construction may be erected in the first story of any building in the inner fire district if the area of such balcony be not in excess of one-third (1/3) of the floor area of the room in which it is erected, and, further, provided that in a fireproof building the total area of balcony be not in excess of six hundred (600) square feet.

"In the inner fire district the partitions in existing VI and VII Class buildings may be of the type permitted in Section 360 and 365, and, with the exception of incombustible stud partitions, the partitions in existing IV and V Class buildings may be those permitted in Sections 360 and 365."

The most practical way to reduce fire loss is to erect and protect fire-safe buildings.

Architectural Terra Cotta in the Construction of Theatres and Motion Picture Houses



Saxe Theatre,
Minneapolis, Minn.

Chapman and Magney, Architects

Front wall construction of light cream and full enamel

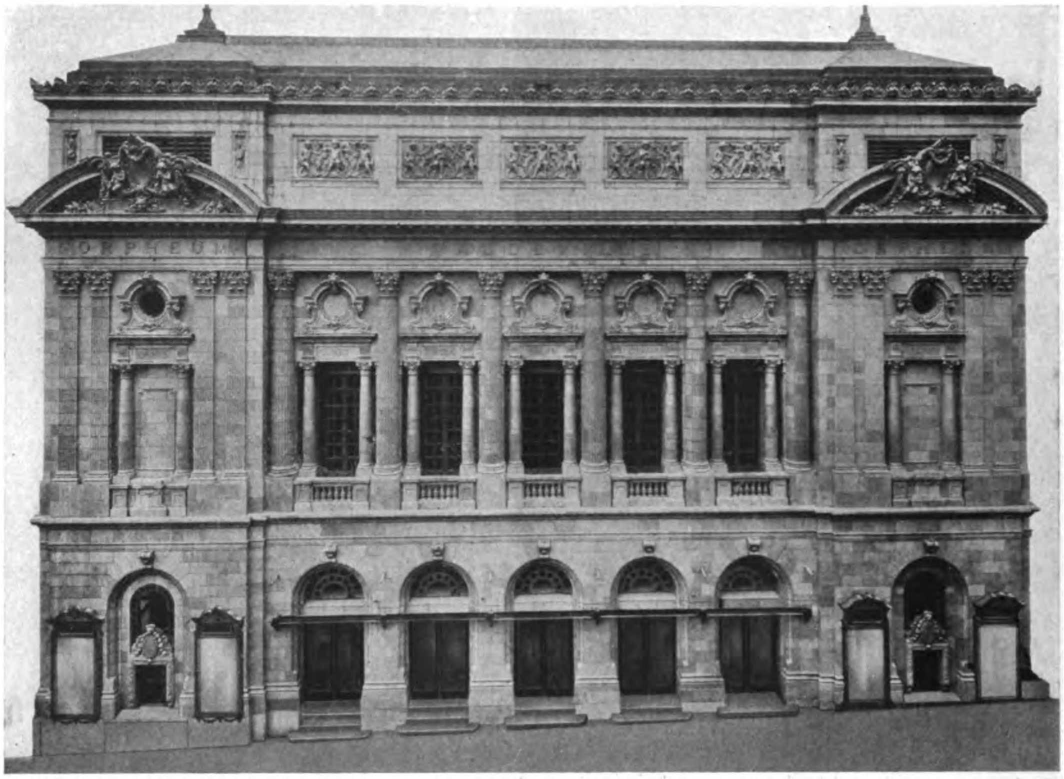
ASIDE from the feeling of security against fire which the use of architectural terra cotta gives in the construction of theatres and motion picture houses, the general effect which such employment insures is highly artistic and easily accounts for the rapidly growing popularity of the product in such connection throughout the country.

Architectural terra cotta is easily obtainable, moderate in cost and readily workable. The combinations to which it is adaptable are without limit, and more and more are being appreciated by property-owners and their architects.

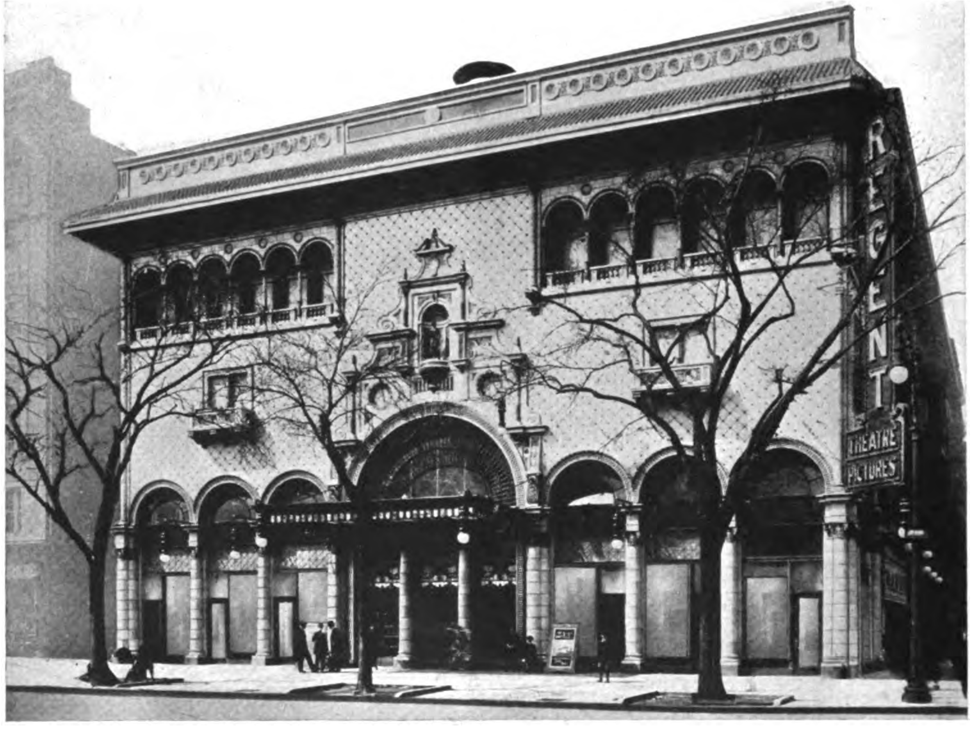
Architectural terra cotta is further excellently adapted to modern building construction because it is at once strong and light. Ordinarily these two qualities are inconsistent: the material that is strong is heavy; that which is light is weak and its fire resistivity is usually very uncertain.

Upon this and the three succeeding pages we present illustrations of a number of houses of amusement built entirely of architectural terra cotta, or terra cotta in conjunction with brick, which amply attest the desirability of this product as a building material.

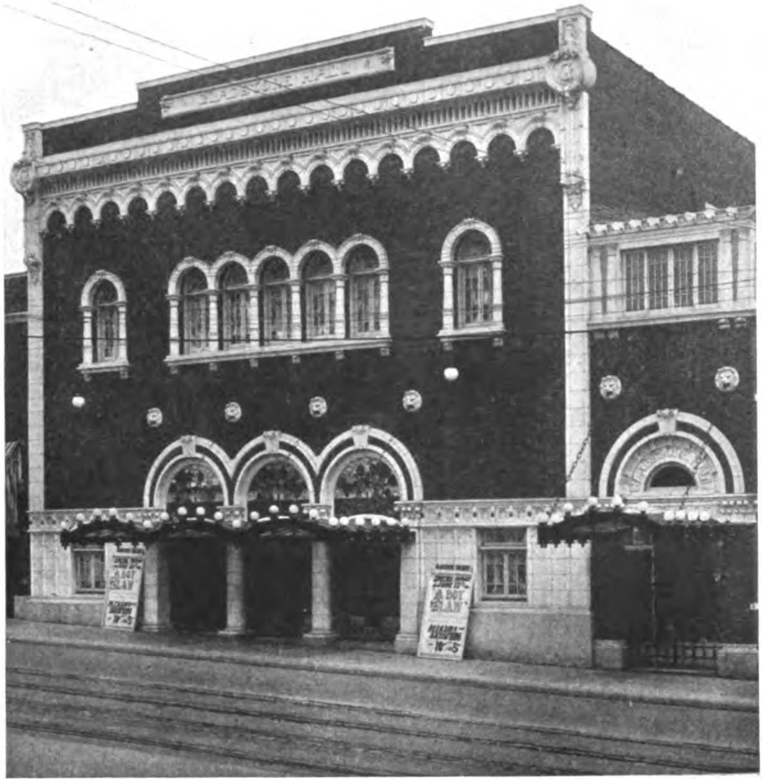
Both by day and by night these properties are notable in their respective cities and contribute in no small degree to the improvement of the localities in which they are situated.



New Orpheum, Kansas City, Mo. J. Albert Lansburgh, Architect. Dull mat finish of lighter shade of pink

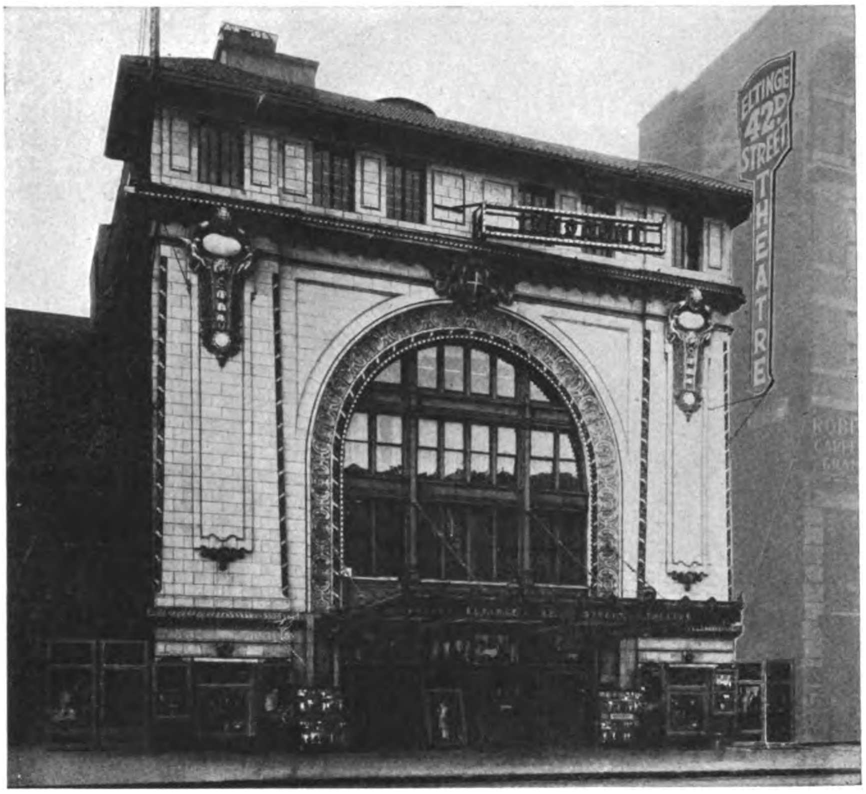


Regent Theatre, New York City. Thomas W. Lamb, Architect. Colorado light cream mat finish. Ornamental arches, golden yellow. Capitals, golden mat. Fill in wall surface, bluish white, fastened with bronze spike

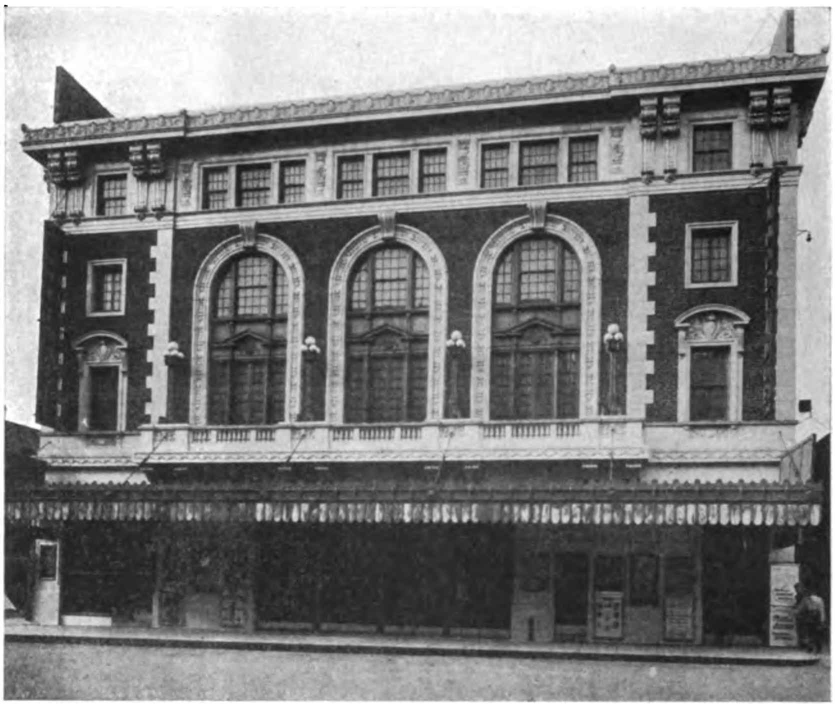


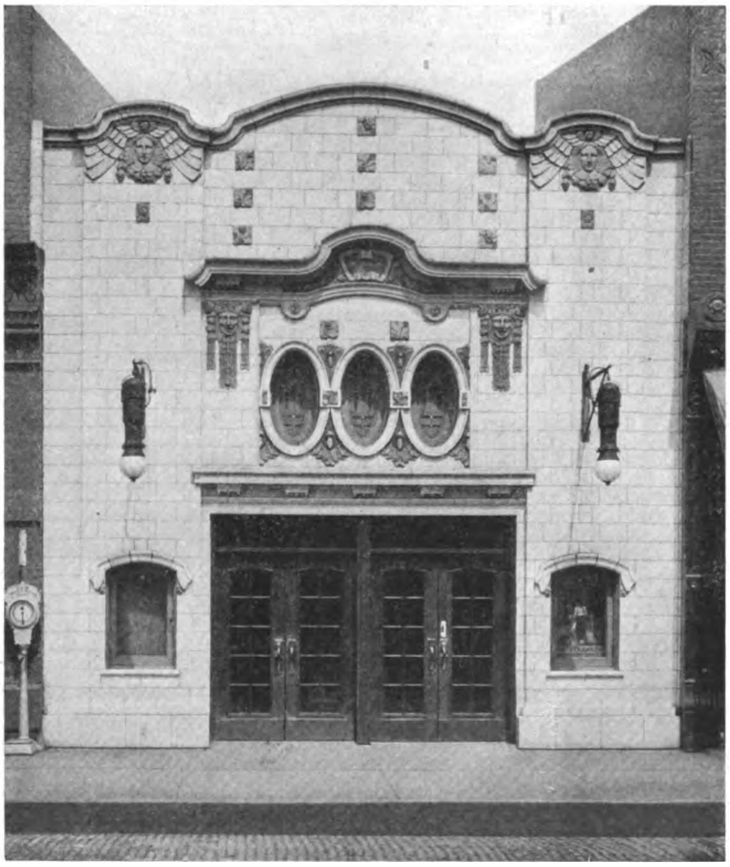
Eltinge Theatre, New York City. Thomas W. Lamb, Architect. Warm gray terra cotta. Decorative features, polychrome in white, green, yellow, brown, blue and red

Gladstone Theatre, Kansas City, Kans. E. T. Madone, Architect. White mat and green enamel upon brick field



Empress Theatre, Des Moines, Iowa. Proudfoot & Rawson, Architects. Cream enamel ornamentation upon green field





Moving Picture Theatre, Chicago, Ill. Perry & Thomas, Architects. Gray enamel architectural terra cotta. Polychrome treatment in ornaments

Serious Fire Results from Explosion of Sugar Dust

ALTHOUGH not definitely known, it is assumed that the fire that destroyed a considerable part of the Brooklyn, N. Y., plant of the American Sugar Refining Company on June 13 last was caused by an explosion of sugar dust.

From a joint report upon the fire issued by the New York Board of Fire Underwriters and the New York Fire Insurance Exchange, we learn that the construction of the destroyed properties was as follows:

Construction of Buildings

"The worst damaged sections E and D are 8 and 7 stories and basement, respectively, of plank and timber construction, with corrugated iron on angle iron roof structures. Area of E is about 9,000 square feet, and D about 12,000 square feet. Walls are entirely of brick, without finish, independent, 24-20-16 inches, except the west wall of D, 20-16-12 inches, and all are reinforced to an extent by 8 to 12-inch pilasters, parapeted 2 to 3 feet all sides with stone coping. No partitions. Skylights none, except wired glass over elevator shafts. Floors, first floor of E, concrete on brick arches on iron beams and girders on cast iron columns, otherwise 4½ to 5-inch plank with hardwood tops with tar paper between, equaling 6 inches in total thickness, on 8 x 12 to 14 x 22 inches, timber girders spaced 10 to 12 feet centers on 10 x 10-inch to 14 x 16-inch timber columns with cast iron pintles, except about one-third of E, mainly in west end, where iron beams in pairs were used, on cast iron columns covered with about 2 inches of concrete, which was encased with sheet iron riveted on. The iron beams were encased with about 2-inch plank covered with asbestos in turn covered with tin. The wood beams and columns throughout were covered with asbestos, and substantial, lock-jointed tin securely applied. Roof composition tar and gravel covered on construction similar to floors. Ceilings open. Floor openings—One continuous stairway in each building, built of iron without risers, but iron landings and wooden treads; in E, in 6-inch tile shaft in iron frame, but not tied into wall; in D, in 12-8-inch brick shaft, both covered by solid roofs; openings protected by 2-ply tin-clad doors of substantial construction. One elevator in each building in enclosures of similar construction to the stairs in respective buildings. Skylights over elevator shafts only, wired glass in metal frames. Numerous openings for conveyors, hoists, lowerators, belts, metal spouts, bins, machinery, etc., through various floors. The hoists and lowerator openings were protected by enclosures of 2-ply wood, lined and covered with asbestos and lock-jointed tin, with doors of same character, mainly self-closing or automatic in action. Perhaps the most notable of the openings are the five sugar bins extending from the third to eighth floors of E, opening in bottom to second. These were of crib construction 10 inches to 6 inches thick, lined with 1-inch hardwood flooring material.

Fire Prevention Devices

"An approved equipment of manual fire alarm boxes was maintained. It was said by an inspector of the Bureau of Fire Prevention to have been tested by him a few days before date of explosion. There was a liberal and well-maintained supply of fire pails and casks throughout. A standpipe system, counted fairly adequate for the plant as a whole and adequate for buildings E, D and C in particular, had two outlets with 50 to 100 feet of 2½-inch linen hose on each floor of each section, connected to two 3-inch risers, supplied with both fresh and salt water by steam pumps of large aggregate capacity located in other groups. The system was capable of being supplied through the fire department siamese, of which there were three on this group, and through fire-boat connections.

"A fairly good dry pipe equipment of automatic sprinklers covered E, D, C, H, and A, except in the metal over-roofed passage between E, D, C and H, the Kent Ave. bridge, the higher bridge over South Third St. and the sugar bins in E, where there were no sprinklers, was installed about 1892 with pipe sizes equaling 1896 standard. Sprinklers mainly Neracher No. 6 with few Grinnell glass disc in unimportant locations. System in E section was controlled by two 5-inch Grinnell differential dry pipe vales, one in basement and one on fourth floor; D section by three 6-inch dry pipe valves of same type located on first, third and fifth floors respectively; C section by two similar 5-inch valves located in basement and fifth floors, and H by one 6-inch valve all connected to a 6-inch main from header foot of South Fourth St.

"Water supplies consist of three 400-gallon Worthington Duplex steam pumps, automatic at 80 pounds, taking suction through two 6-inch connections to 12-inch city main with 45-pound head, as well as from the East River and by four 15,000-gallon gravity tanks located over roof of buildings A and B.

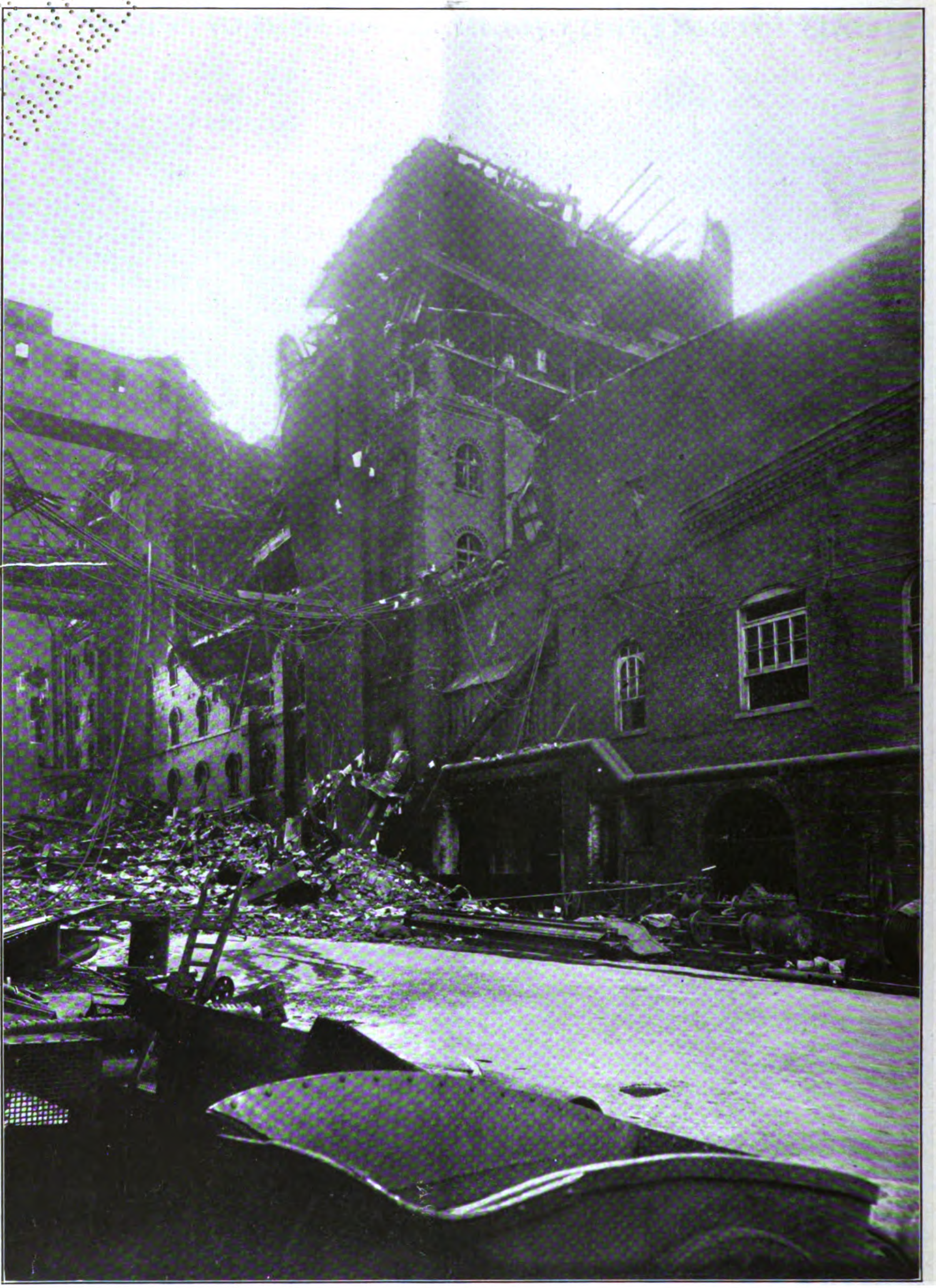
"The sprinkler equipment, however, was not a factor, it having been crippled by the explosion in its earliest stages."

Safety Recommendations

The recommendations of the underwriters to safeguard against similar disastrous happenings in future are as here given:

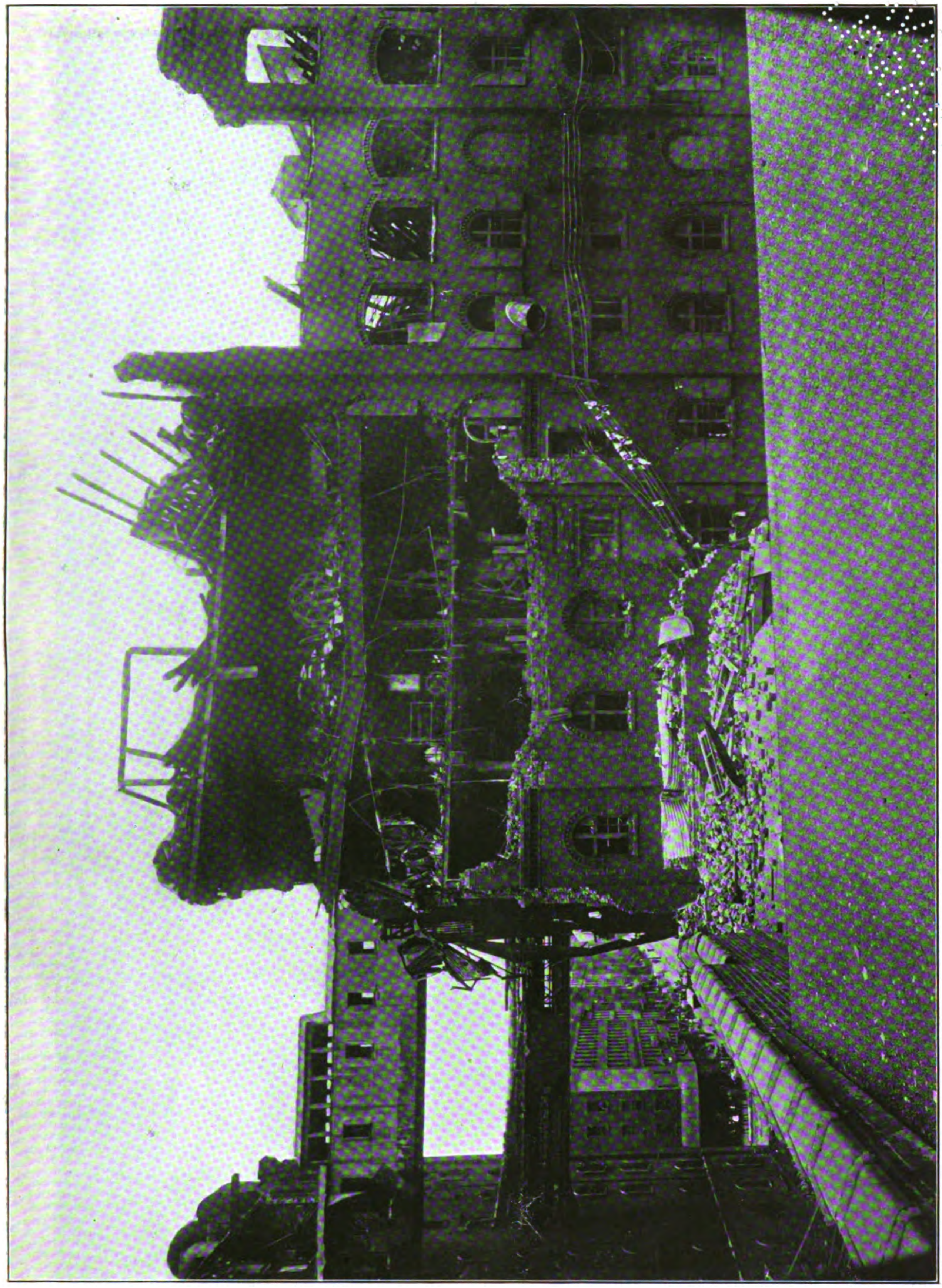
"Extreme precautions should be taken to minimize

(*Continued on page* 208)



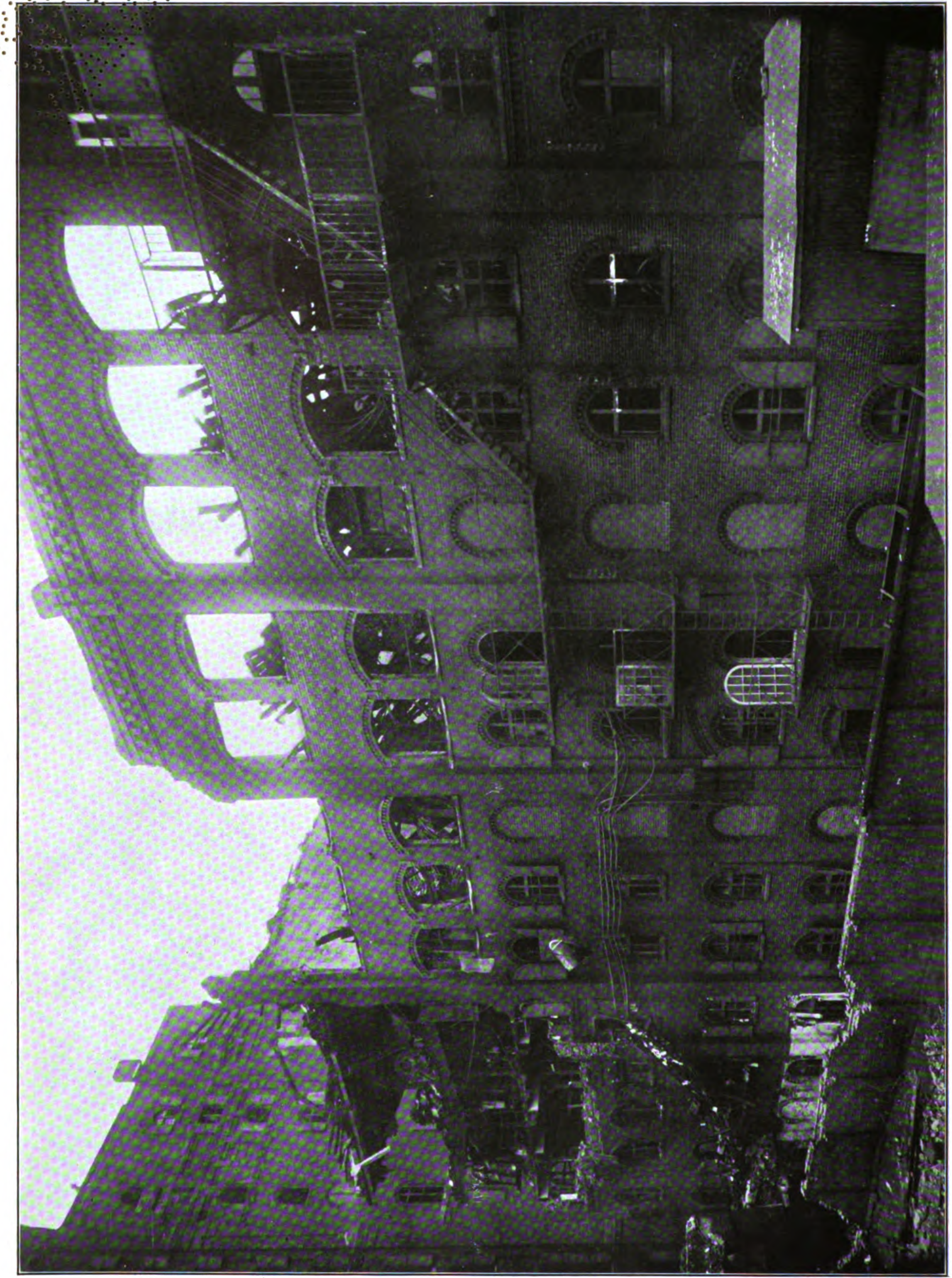
North wall and upper part of west wall of Building E, of Brooklyn, N. Y., plant of American Sugar Refining Company, also portion of north wall of Building H looking due south

Courtesy New York Board of Fire Underwriters and New York Fire Insurance Exchange.



West wall of Buildings E and D of Brooklyn, N. Y., plant of American Sugar Refining Company, also bridges across South Third Street to Building A; also portion of south wall of Building A

Courtesy New York Board of Fire Underwriters and New York Fire Insurance Exchange



West (rear) wall of Buildings E and D destroyed, Brooklyn, N. Y., plant of American Sugar Refining Company

Courtesy New York Board of Fire Underwriters and New York Fire Insurance Exchange.

Fire Hazards in Pennsylvania Industrial Properties

"MOVED by the tragic circumstances of the Triangle fire in New York City, and remorseful for the indifference and inertia of educated and well-to-do women who tolerate the conditions that have led to similar tragedies elsewhere," a number of the Alumnæ of Bryn Mawr College some months ago concluded to make a study of fire prevention in Pennsylvania, and present to the State Department of Labor and Industry a report of their findings and recommendations.

The report, recently completed, is highly interesting, and it is to be hoped its publication will serve to improve the character of many of the Keystone State properties in which women and children are forced to labor.

In the course of their investigation the parties engaged in the college alumnæ visited 111 establishments located in different parts of the State. A summary of their findings disclosed that of these properties:

25 had fire walls; 86 had no fire walls.

27 had fire towers; 84 had no fire towers.

23 had enclosed, fire resistant stairways, leading directly to the street; 12, leading to the first floor; 76 had no enclosed stairs.

89 had outside iron fire escape. Of these,

In 45 there were no enclosed stairways, fire towers or fire wall, the sole reliance being upon open stairways.

In 80 there was no fire-resistant protection over the windows and doors to which the fire escapes were exposed.

In 70 the exits were locked, or difficult of access, or obstructed in some manner.

33 had exit doors which swung in the wrong direction—against travel.

Altogether, it was judged that 30 of the establishments inspected had adequate exit facilities; in 4, new exits were in process of construction; 77 were judged inadequate.

52 were equipped with automatic sprinklers; 59 were not.

33 were equipped with inside hose; 78 were not.

27 were equipped with chemical extinguishers; 84 were not.

53 were adequately equipped with fire pails; 54 were not. (In 4 places a fire had recently occurred, and it was not possible to determine this accurately.)

46 were equipped with a fire alarm system, of which 5 were out of order; 66 had no system of alarm.

22 held fire drills; 89 held none.

In 43 places some sort of dangerous or inflammable substance, such as kerosene, gasoline, turpentine, etc., was in use; in 18 of these places this material was properly stored or kept.

91 places were lighted in part or whole by open, exposed lights.

39 were heated by open coal stoves.

55 allowed smoking; 56 did not.

It is interesting to note that of the 41 garment manufacturing establishments inspected not one had a fire drill; 26 were heated by coal stoves; in 35 signs of smoking were obvious, or smoking was actually seen; and all but one establishment had open lights or gas flames. In view of the fact that cotton materials are almost invariably present in large quantities in these shops, this is a peculiarly significant record. The situation is partly due to the fact that the garment trades are, above all others, characterized by sweatshop conditions which breed the germs of accident no less than those of disease, and a number of these sweatshops were normally visited in the course of investigating this industry.

The conditions and practices most active in causing fires, which were met in the course of the survey, were:

Causes of Fire

Improper storage of inflammables or dangerous materials. Paints and varnishes were in open tins in a furnace room; alcohol and turpentine in 10-gallon containers, with the corks missing, in a room where wood decoration required open gas burners, lighted with matches.

Improper receptacles for oily waste, dust and ashes.

Storage of rags, lumber, etc., under stairs.

Collections of inflammable rubbish, dust, etc., especially in cupboards, in basements and under stairs.

Furnaces and coal stoves close to woodwork or pasteboard partitions, without protection.

Hot radiator pipes, with combustible materials stuffed behind them.

Extension wires of electric lights, with worn covering, hung over nails, or crossed over each other.

Gas burners and gas lights without protection, very often close to heaps of cotton goods or cotton cuttings.

Accumulations of paper and cotton cuttings in work rooms; oily rags and waste about machines.

Excelsior, packing materials and paper in large quantities not isolated.

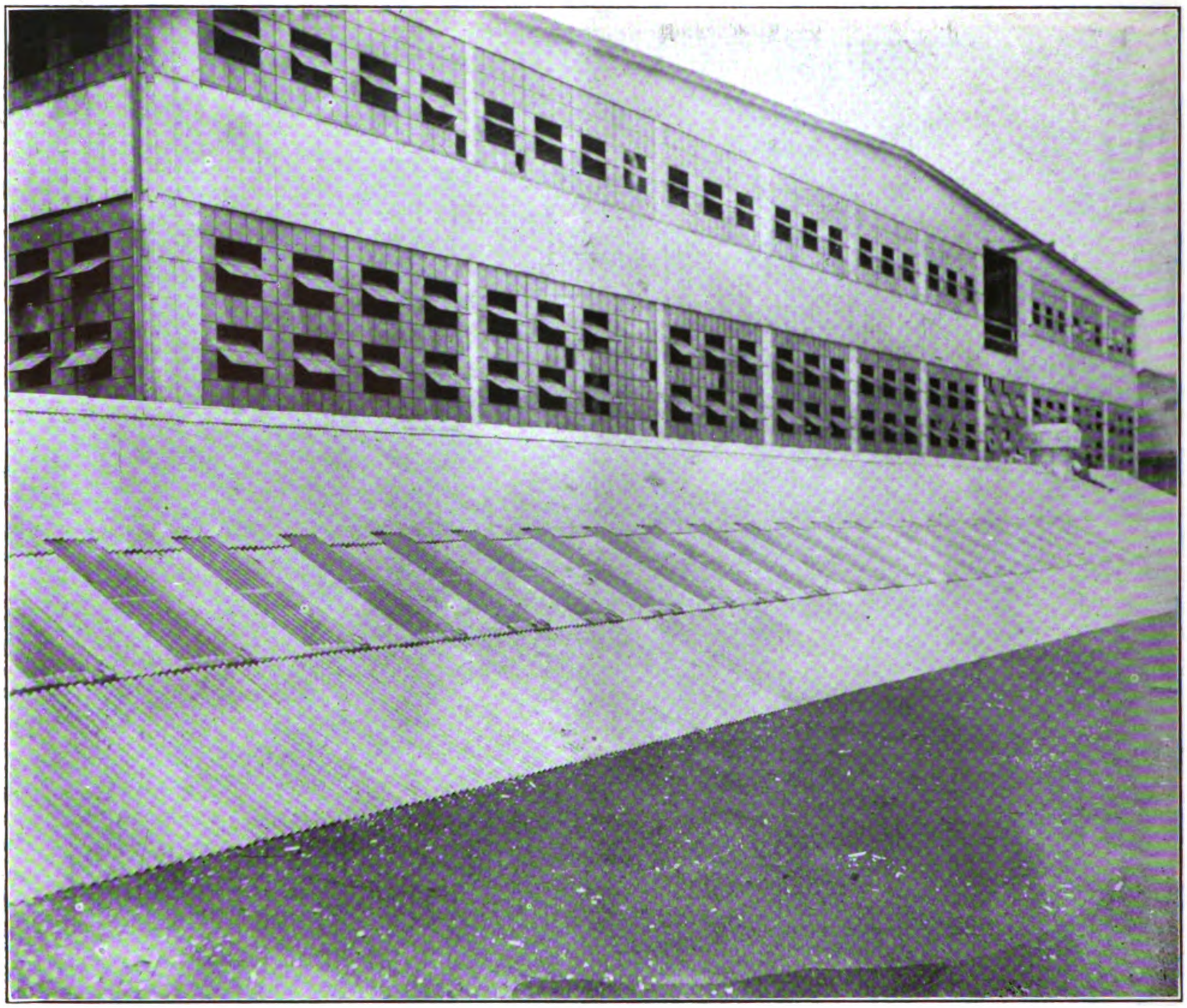
The use of matches.

Smoking.

Manufacturing processes, likely to cause sparks or flames, not isolated.

Hazardous occupancies, in non-fireproof buildings—hay and feed, paints and varnishes, motion-picture films.

Wooden lockers for clothing in which a half-smoked pipe is sometimes thrust.



An exterior view of a section of a recent addition to the Philadelphia plant of William Cramp & Sons Ship & Engine Building Company, showing the corrugated wire glass skylights installed by the Keasbey & Mattison Company

For Better Building Ordinances at Pittsburgh

ALIVE to the need for a modernized Building Code as a means of reducing the fire hazard in Pittsburgh, the Civic Club of the city has given the matter very attentive study during the past twelve months and submits the following as concrete evidence of its activity during that period:

"Five ordinances were introduced by the Code Committee during the year:

"The first dealt with the organization of the Bureau of Building Inspection, the duties and qualifications of the employees, while the second covered the powers and duties of the same bureau and methods of procedure.

"The third ordinance, introduced in April, covered motion picture film exchange buildings. It was approved by Council in May, but returned to the Committee for additional recommendations.

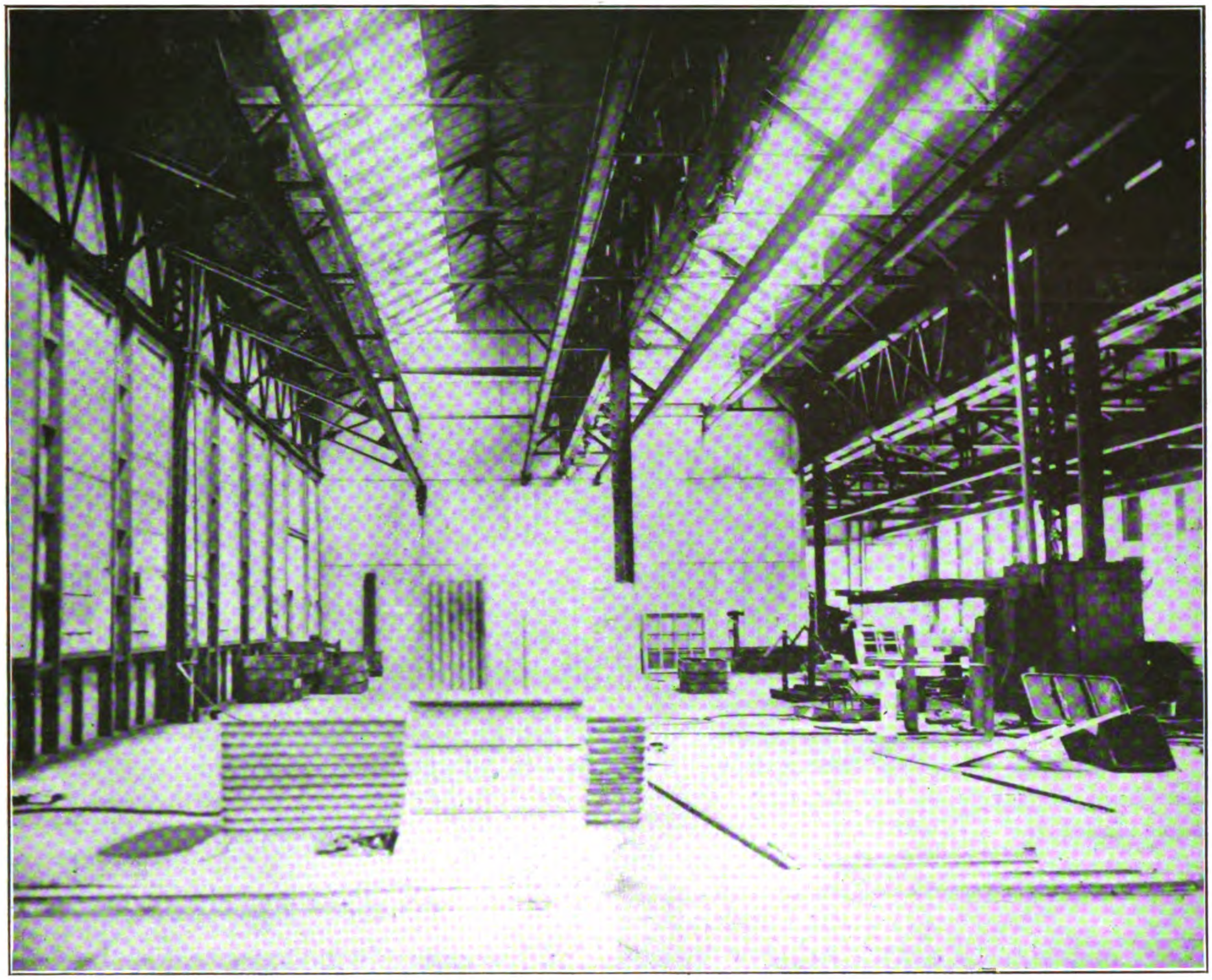
"At the same time, an ordinance known as Temporary Building Regulations was introduced. With a few minor exceptions the old building laws went out of existence in January, 1916.

"An elevator ordinance was introduced in temporary form in December, 1915.

"A great deal of difficulty was experienced in promoting definite action in Council on proposed ordinances and so much opposition was raised to sections prepared that the Building Code Committee decided to hold hearings before preparing ordinances for introduction.

"Early in July a letter was sent to Council from the Club calling the attention of that body to the importance of fire protection as the first consideration in the preparation of the Building Code and stating that 'safety first' should take precedence over the desires of any particular interest.

"The communication also strongly urged that the Building Code Committee's recommendations on the



Interior view of the structure shown upon the opposite page. The character of the construction and the wire glass upon the roof **insure maximum light and ventilation, enabling the employees of the company to dispatch a quality and quantity of work impossible under less favorable conditions**

storage of films be followed, since they were made only after careful study of the situation.

"Real progress in the work was also greatly hampered by the fact that Council granted an appropriation for the salary of the secretary-engineer, but made no appropriation for an assistant, a stenographer or for headquarters. However, in September the secretary was authorized to lease space and an assistant was granted, with the result that greater progress was immediately possible.

"The additional ordinances have been completed and three others are almost ready for submission to the Building Code Committee.

"Because of the fact that since ordinances introduced in Council were vigorously opposed by various interests, a special Building Code Committee of the Civic Club was appointed to study the recommendations of the Building Code Committee and to discuss them before City Council when necessary."

The need for improvement in the building code of Pittsburgh has long been patent to those familiar with conditions in that city, and it is encouraging to know that a complete draft of new ordinances has been prepared under competent direction and is now before the proper municipal committee for review.

Brick Buildings Do Not Depreciate

WHEN it comes to the annual taking up of the subjects of depreciation and appraisal, says *The Clay-Worker*, the brick man has a twofold interest to look after. He has the usual matters of depreciation and appraisal of buildings and equipment in his own plant. Then he has, or should have, interest in the fact that where other factory buildings are made of brick the depreciation per year is much less than if made of flimsy material, or of something likely to catch fire and burn. It is a good time to remind factory owners that a brick building may be worth more after ten years of service than its original cost.

A Department Devoted to the Use of

AUTOMATIC SPRINKLERS

Edited

IRA G. HOAGLAND, Secretary **PAUL MASON, Special Representative**
National Automatic Sprinkler Association

Better Maintenance—Better Sprinkler Efficiency

MAINTENANCE in the highest possible state of efficiency is a vital factor in fire control by automatic sprinklers; for, efficient as they are, their efficiency is affected more or less seriously by human neglect. During the next few months freezing of water in pipes represents the chief peril to sprinkler efficiency in the way of human neglect, but there are other phases that should be regarded every time a sprinkler system is inspected or considered, and that should be guarded against with unwearied vigilance.

Lately, CONSTRVCTION has been giving some attention to sprinkler equipments for fire-resistant—the so-called "fireproof"—buildings and has pointed out, with some emphasis, that "fireproof" buildings that were not sprinklered have burned; but sprinkler equipments are found in all classes of buildings, ranging from those of the highest type of construction to those that without sprinkler protection are nothing less than firetraps, and in all of them maintenance is the factor vital to safety; in all of them human neglect a menace.

Long Record for Efficiency

In the more than twenty years during which authentic record of sprinkler efficiency has been kept there has been a steadily increasing approximation to perfection. Those factors in the equipments themselves which, by reason of their failure, have operated to prevent perfect control have been and still are a constantly decreasing proportion of the small and decreasing table of unsatisfactory control; but in late years there has been an increase in faults of maintenance—either active human intervention or mere human neglect—that has almost, though not quite, counterbalanced the gain made in perfection of the equipments themselves.

The seasonal hazard is "sprinkler system crippled due to freezing," as it is classified in the records of the National Fire Protection Association, which shows that during the last twenty years more than two per cent of all the instances of unsatisfactory control have been due to this cause. Unfortunately, records of losses are not given and, except occasionally, stories of the fires themselves are not available, but out of the knowledge gained from study of these cases the N. F. P. A. has lately issued its ante-winter warning against this hazard, predicating it particularly on the fact that last winter there were a number of disastrous losses due to freezing of equipments.

Precautions Against Freezing

Unless extreme vigilance is exercised the very best installation of fire appliances may suffer temporary disablement from frost. Automatic sprinkler systems, hydrants and all appliances using water for fire extinguishment naturally require special care and attention in winter; but, as the automatic sprinkler is the only one whose province is to operate automatically, immediately, and at the exact seat of the blaze, the necessity for supercare in its case is pre-eminent. The following precautions should be taken, inspections being thorough, with nothing taken for granted:

1. Ascertain if all portions of buildings are properly heated at all times to prevent freezing in any of the sprinkler pipes, particular attention being given to exposed places, such as hallways, entries, stair towers, under sidewalks, show windows, shipping rooms, attics, roof monitors and skylights.

2. Examine tanks and all pipes, fittings and valves, whether for steam heating, general water service or fire protection. See that none is frozen or has been frozen and that they are all in operative condition, and where there is any liability of freezing, provide the necessary protection. All metal work supporting tanks should be thoroughly cleaned from rust and painted, also tank hoops.

3. Examine carefully and provide suitable boxing around any pipe lines which may be in an exposed location (either between ground and first floor, between buildings, or near windows, doors, etc.). Make frequent tests during the winter of such sprinkler systems in order to make sure the piping is not frozen.

4. Ascertain if sprinkler dry valves are in working order, not leaking, and piping thoroughly drained, if alarm connections and gong are in order, if air pumps can be depended on for the winter.

NOTE.—Do not overlook low points on dry system not controlled by main drain. Blow low points out occasionally to free from condensation.

5. See that all valves are open that should be open, and try water outlets to ascertain if all pipes are free and ready for service.

6. See that extra sprinklers are on hand in case of need to replace frozen or melted heads.

7. Be sure that engineer or supervising employee is fully posted as to the purpose and intention of every valve and pipe.

8. Try pumps and see that they are in proper working order.

9. Test all of the hydrants and indicator posts and see that they drain properly.

10. Examine inside standpipes and connections.

11. Instruct the night watchman thoroughly in the use of all fire apparatus and the operation of all valves.

12. Examine the end of suction pipe to see that leaves or other refuse matter have not clogged up the holes in the strainer. The capacity of the pump may be greatly reduced by this defect.

13. Take measures to prevent freezing of water in casks and pails in cold buildings.

14. Empty and recharge chemical extinguishers to insure their being in perfect working order.

Other Points to Watch

A thorough examination should be made of the entire heating system before putting it into service. All heating pipes should be carefully brushed down, and where piping is located along walls, rubbish or litter which may have accumulated should be removed and pipes kept free from dangerous contact with walls, partitions, etc.

When it becomes necessary to close a sprinkler valve during working hours, a competent man should be stationed at the valve, so that water can be turned on immediately in case fire develops.

When it is necessary to make changes in the sprinkler system, extra care should be taken to have the least possible portion of the equipment out of commission at one time.

Whenever it is necessary to shut off the sprinklers, or in any way modify the fire protection, the inspection department having jurisdiction should first be notified. To this might well be added that the nearest fire department station should be notified when the water is turned off and that both should be promptly advised when the system is restored to operative condition. If the fire department is notified that water is off the sprinklers, the fact will be conducive to greater promptitude in responding to an alarm.

Other Hazard of Neglect

The freezing hazard is a winter hazard, but other factors of human neglect are present all the year, and if winter calls for special vigilance and care to prevent freezing, constant vigilance should be exercised all the seasons round to guard against the others. Of these, the chief is water turned off, which, during the 20-year period, affected 64 of the 138 classes in which sprinklered risks were listed as affected by fire, which is 63.3 per cent of the classes showing unsatisfactory control, and was responsible for 230 of the 851 cases of unsatisfactory control, or 27.1 per cent. This was the most prolific of all causes of unsatisfactory control.

"Obstruction to distribution," due to high piling of goods, arrangement of shelving, tables, etc., which is the second of what may be regarded as the positive causes of unsatisfactory control, was responsible for 52 fires, or 6.1 per cent during the 20-year period. These are the two active phases of human intervention

Some Negative Causes

Negative (or passive) causes affecting sprinkler efficiency are manifest in several phases. These include: Generally defective equipment and unsprinklered portions; defective water supply or supplies (both of which usually mean systems improperly installed); system crippled due to freezing; faulty building construction; concealed spaces, and vertical openings.

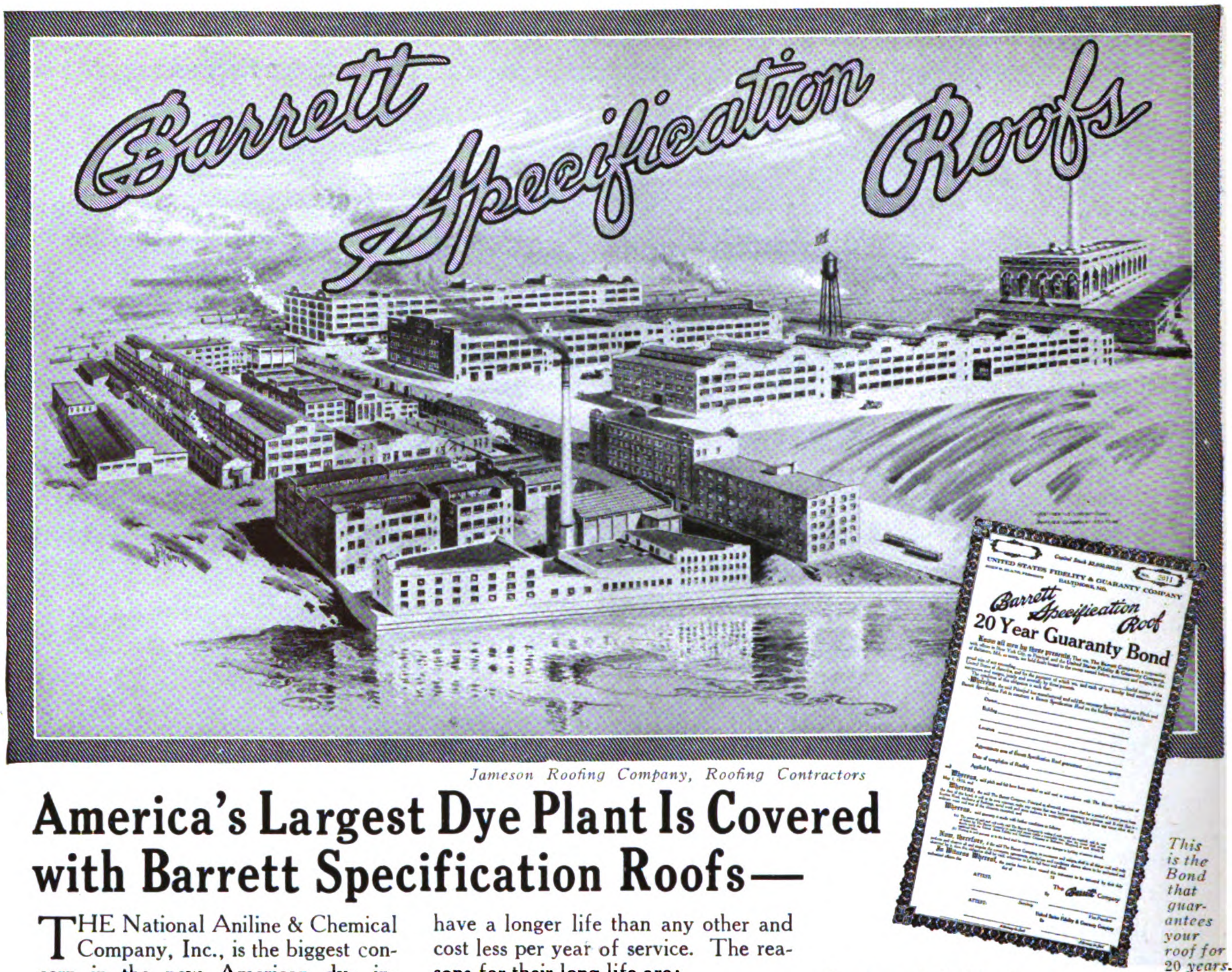
Effect of freezing has been discussed at length. Generally defective equipment and unsprinklered portions is the most prolific, after water shut off, of all causes of unsatisfactory control. In the 20-year period it was responsible for 196 instances, or 23 per cent of the total.

Defective water supply or supplies accounted for 83, or 9.8 per cent, while faulty building construction was responsible for 38, or 4.5 per cent.

The aggregate number due to these causes was 235, or 27.6 per cent, during the 20-year period.

Careful study of the record shows that, while carelessness is resulting in a considerable increase in the number of instances of unsatisfactory control in the various classes, causes involving mere inertia, neglect, or the ignoring of favorable factors are slowly being eliminated, with the result that in this respect the record of sprinkler efficiency is being strengthened. With the closing up of the structural gaps—concealed spaces, unsprinklered portions, vertical openings, etc.—a long step will have been taken to make this part of the record a blank, so far as unsatisfactory control is concerned, in the years to come.

The increased activity in industrial plants supplies an additional reason for the complete equipment of all such properties with automatic sprinklers.



Jameson Roofing Company, Roofing Contractors

UNITED STATES FIDELITY & GUARANTY COMPANY
BALTIMORE, MD.

Barrett Specification Roof
20 Year Guaranty Bond

This is the Bond that guarantees your roof for 20 years.

America's Largest Dye Plant Is Covered with Barrett Specification Roofs—

THE National Aniline & Chemical Company, Inc., is the biggest concern in the new American dye industry.

It has plants in various parts of the country and today is turning out dyes equal in every way to those formerly produced in Germany.

Its most important plant is the Schoellkopf Works located at Buffalo, N. Y., illustrated herewith.

This plant was designed and constructed by The John W. Cowper Company, one of the largest firms of engineers in this country, and it represents the very best in building construction.

Quite naturally Barrett Specification Roofs were chosen to cover the various buildings in preference to any other type because the experience of many years has demonstrated that these roofs have a longer life than any other and cost less per year of service. The reasons for their long life are:

First,
because they are constructed of Barrett Specification Pitch and Felt, *the greatest waterproofing materials known.*

Second,
because a *greater amount* of waterproofing is used in Barrett Specification Roofs than in any other kind of roof-covering, and the amount of waterproofing material in the roof largely determines its life.

Third,
because under the 20-Year Guaranty Plan the roofs must be constructed *under the supervision of our inspectors*, and we know, therefore, that they will be constructed right.

In view of all this, do you wonder that Barrett Specification Roofs are more popular than any other type for use on permanent buildings of all kinds?

The 20-Year Guaranty Bond

We are now prepared to give a 20-Year Surety Bond on all Barrett Specification Roofs of fifty squares and over, in all towns in the United States and Canada with a population of 25,000 and over, and *in smaller places where our Inspection Service is available.*

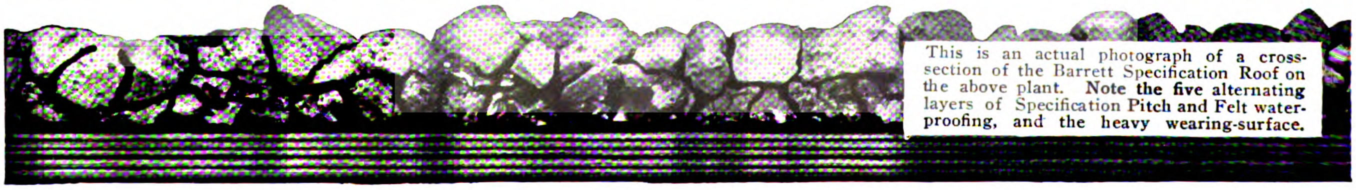
Our only requirements are that The Barrett Specification dated May 1, 1916, shall be strictly followed and that the roofing contractor shall be approved by us.

Copies of The Barrett 20-Year Specification, with roofing diagrams, mailed free on request.

The Barrett Company

New York Chicago Philadelphia Boston St. Louis Cleveland Cincinnati Pittsburgh
Detroit Birmingham Kansas City Minneapolis Salt Lake City Nashville Seattle Peoria

THE BARRETT COMPANY, Limited
Montreal Toronto Winnipeg Vancouver St. John, N. B. Halifax, N. S. Sydney, N. S.



This is an actual photograph of a cross-section of the Barrett Specification Roof on the above plant. Note the five alternating layers of Specification Pitch and Felt waterproofing, and the heavy wearing-surface.

SAFE HOMES

Edited by RALPH P. STODDARD, Secretary
Society Advocating Fire Elimination

Studying Building Conditions at Cleveland

THE building interests of Cleveland are uniting in a survey of conditions with the view of encouraging building for the coming year and offset, as far as possible, the slump that has set in during the closing month of the old year. Similar steps have been taken in New York, Chicago, Detroit, Minneapolis and Boston, and the survey in these cities will follow a uniform line.

The investigation will include interviews with investors, home builders, institutions making building loans, real estate and renting operators, architects, engineers, manufacturers and dealers in materials, transportation interests, labor interests and building organizations. The initiative in this effort has been taken by the Building Exchange of Cleveland in co-operation with the Society Advocating Fire Elimination, the Supply Dealers' Board, Retail Lumber Board and the Real Estate Exchange.

Effort will be made to determine the extent to which there is a demand for new building, the types of building needed, prices of materials and labor, and facilities for financing. Meetings of the interested organizations have already been held and consideration has been given to a plan for increasing the funds available for building loans.

Cleveland is thought to be typical of the industrial cities of the Middle West and East and perhaps is getting its full share of war business. The price of materials and labor is not higher or lower here than in any other city of similar size. The city showed a falling off in building permits in November of about fifty per cent as compared with the same month of 1916, yet the city's total for building operations up to December 1 was only about three per cent below the first eleven months of last year. December is expected to show another decrease in operations, in spite of the fact that there is a shortage of homes, apartments and of manufacturing space. It is the opinion of builders that the decreased activities are due to inability to finance and are not a result of the prices of material and labor.

It will be the purpose of the survey to picture the existing conditions in a way that will encourage the resumption of building in normal volume. It may result in the organization of a financing company that will give to the builder funds to carry on the work. Transportation problems are not thought to interfere with building work in Cleveland. Northern Ohio supplies great quantities of all clay products, sand, gravel and stone, metal lath, gypsum and some cement. The lumber dealers are well stocked, and with Lake transportations expect to be able to renew their supply at the resumption of navigation on the Lakes in the spring.

There seems to be no other reason than a psychological one why building should not go forward when money is provided for financing.

For the Reorganization of the National Builders Supply Association

CONSTRVCTION, in its last issue, noted the call that had been issued for the gathering of building material dealers at Pittsburgh, December 6. The meeting held at that time resulted in important steps toward the reorganization of the present National Builders Supply Association. The meeting was attended by representatives of State and district organizations throughout the United States, who spoke for about 1,500 individual dealers from the New England association, Delaware, Maryland, District of Columbia, New York, Ohio, Indiana, Illinois, Pennsylvania State organizations, and from city organizations in Minneapolis, St. Paul and St. Louis.

After an all-day and nearly an all-night session a new constitution was drafted, with a resolution that it be presented to the National Building Supply Association at its annual convention in Chicago in February, with recommendations that it be adopted. The new constitution makes the National Association a delegate body. The Association will be represented by a board of directors, who will name a small executive committee empowered to act upon subjects of interest to the trade generally.

It is expected that this new organization will fully meet the needs of the industry of the present day.

Bankers in More Liberal Mood

BUILDERS are taking heart from recent developments in Cleveland, Ohio, which has effected a loosening up of loans for building.

They see an end to the state of affairs, resulting from the attitude on the part of banks to refuse more than limited aid to this branch of industry, which had all but paralyzed operations in the line of new construction.

A canvass of banks and building and loan companies shows a number that are in a receptive mood for loans for building. They have come at length to realize that, with a pressing demand for accommodations for at least 15,000 families, building offers an unequaled security for money invested.

Building and loan companies are showing wonderful expansion. The past two years have been ones for big profits. Many are increasing their working capitals to meet increased demands. One new company, incorporated at $2,000,000, has, during the past month, raised its capitalization to five million.

Despite adverse conditions, new building in Cleveland is but $80,00 under last year, to November 10. Last year's record is not expected to be exceeded, as November and December of 1916 were months of exceptional activity, which it will be all but impossible to equal.

With the prospect of easier money, however, those in the building trades there anticipate a winter which will compare favorably with those in the past.

Demand Houses of Brick or Stucco Construction

THAT the propaganda for firesafe home building is taking effect in the Cleveland district is evidenced by the demands made upon architects for this type of residence.

A number of architects, whose work formerly was exclusively in frame residences, report that nearly fifty per cent of their inquiries at the present time are for houses of brick or stucco. J. M. Bostwick, architect in the Park Building, Cleveland, is one who finds his business running almost exclusively to houses of brick, tile or metal lath stucco. Mr. Bostwick is a designer of many of the finest homes in the Shaker Heights district, which is Cleveland's newest high-grade residence section. While the range has been from $10,000 and up, there occasionally are requests for bungalows and small homes at a price considerably under this range.

A recent building shows one of the latest pieces of work from the board of Mr. Bostwick. This is an American type of bungalow built in the same substantial construction as the large homes with basement under the entire house. There are no rooms in the attic, but the ground floor, as the floor plan shows, will accommodate the average family. The feature of this design is the sun room opening from the corner of the living room.

The house is designed to be erected in a hollow tile and stucco and is to be built at once in Shaker Heights.

The small house shown in the previous issue of CONSTRVCTION as the safe homes feature is also the work of Architect Bostwick, although his name was inadvertently omitted from the story. Mr. Bostwick has just taken figures upon the bungalow shown here and states it can be completed for $4,000.

To Encourage Better Building

THERE will be held in Columbus on January 21 to 30 a Real Estate and Building Show. Three buildings of the Ohio State Fair Association, centrally located in the capitol city, will house the exhibits.

The display will be wide in its scope and will have as a motive the encouragement of better building. The show is under the management of M. A. Vinson, who was associated with the successful Cleveland building show of 1916. The Ohio Lumber Dealers' Association and the Ohio Builders' Supply Association will hold their annual conventions in Columbus during the period of the show, and joint conferences of all building interests are to be held in Columbus at that time to discuss the building situation.

The show will interest the owner, the architect and the builder and is expected to attract a large attendance.

Serious Fire Results from Explosion of Sugar Dust

(Continued from page 197)

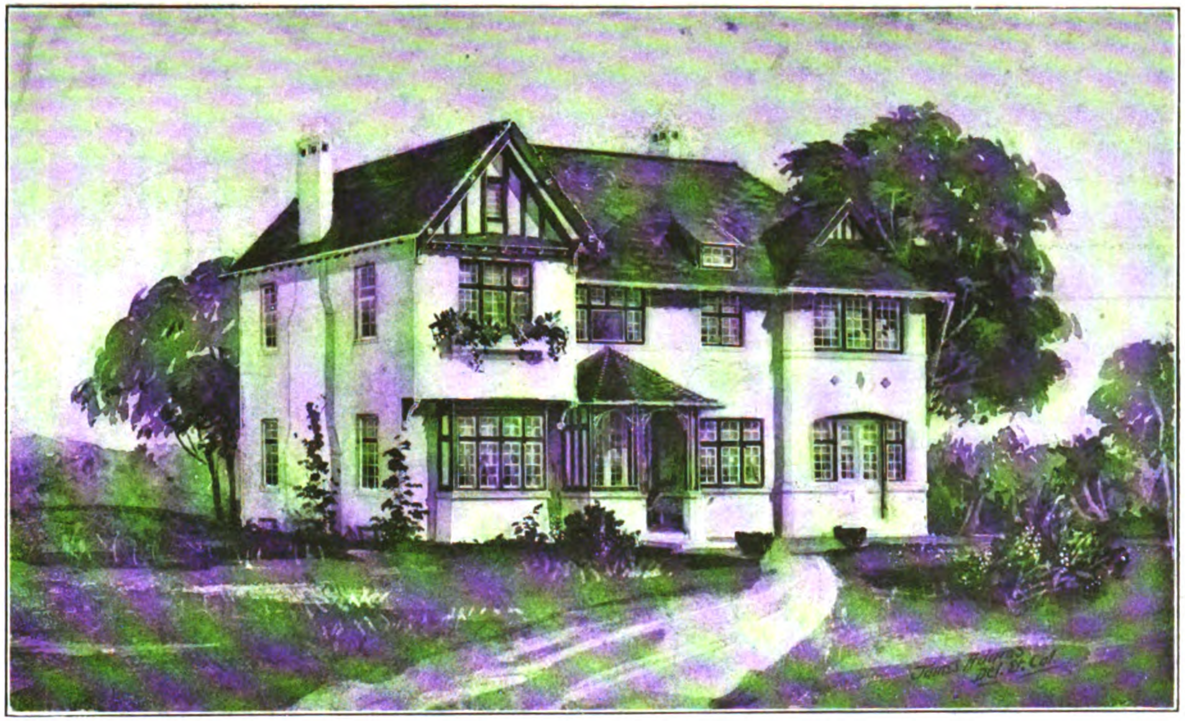
the hazard from fire and explosion in sugar dust, which is the most serious hazard incident to the various processes of sugar refining. The dust should be confined to the apparatus in which the sugar is being handled: (cleanliness of the modern flour mill exemplifies this precaution). Wherever possible, accumulations of sugar dust should be dissolved by passing through a spray of water.

"It is essential that mills for pulverizing sugar should be equipped with magnets, screens and explosion-preventing devices, together with an adequate vent leading to the outside of the building.

"All open fires, lights and electrical devices emitting sparks should be excluded from rooms liable to contain sugar dust. Machinery or processes producing sugar dust should be segregated in a separate building, or the room cut off by fire walls without direct communication to other buildings. The outside walls facing away from adjacent buildings should preferably be of light construction, so that the force of any explosion may readily vent itself in that direction. A liberal supply of windows with ordinary thin glass will afford suitable facilities for venting an explosion."

·A·FIRE-SAFE·HOME·

·DESIGNED·BY·
·ADAMS & McCLUSKEY·
·ARCHITECTS·
·NEW HAVEN CONN·



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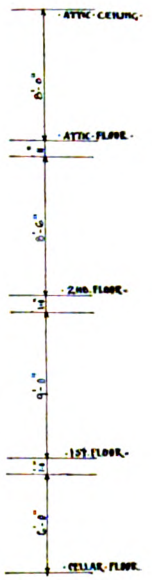

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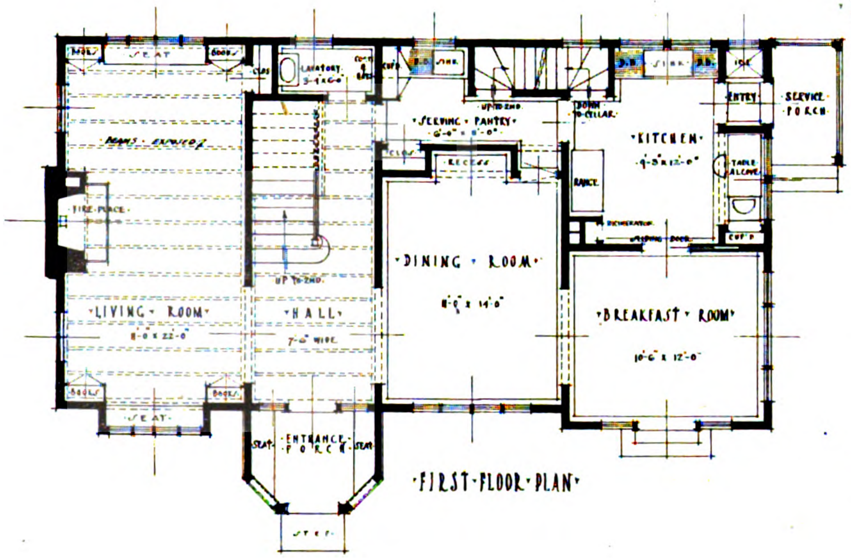
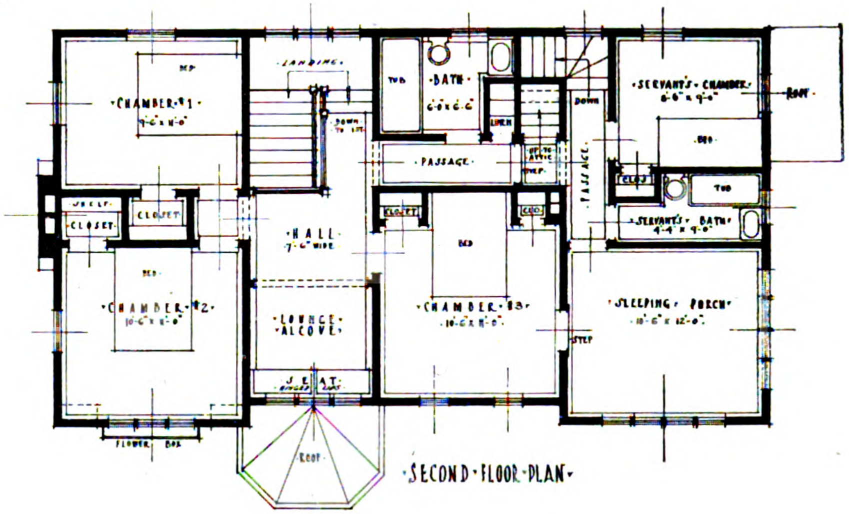


·FIRST·FLOOR·PLAN·



·SECOND·FLOOR·PLAN·

America builds back to Permanency

HIGH up in the pockets of great cliffs, sheer above the dangers of life thousands of years ago, our American predecessors lived in permanent buildings. Here they were free from the awful forest fire, the lurk of beasts and the treachery of fever-laden air.

For entirely different reasons but with equally good judgment, modern America has moved back into the permanent building. Structurally, we have found ourselves. Our cities have staked their claims once for all and have set about to make building history that will not pass like the Red Man's wigwam. We have learned a lesson from the age of inflammable materials just past, which from log cabin to Queen Anne Mansion has gone—leaving a blot on the pages of building history.

Concrete, Steel, Stone, Masonry and Asbestos—these materials have focused thought on building permanency. The first four have given us the permanent building. Asbestos has topped it all with a lasting, mineral, stone roofing that repels fire and resists the ravages of time.

Nor is Johns-Manville Asbestos restricted in its application to the pretentious building of steel, concrete or stone. Its use as a roofing is reaching out everywhere*—to the farm, the home and the out-building. Here, too, its lasting power is a protection against fire, rot and disintegration. It is America's safest and most economical roofing.

H. W. JOHNS-MANVILLE CO.
NEW YORK CITY
10 Factories—Branches in 55 Large Cities

**Johns-Manville Asbestos Built-Up Roofing for flat roofs; Asbestos Ready Roofing for sloping surfaces; Transite Asbestos Shingles for the home; Corrugated Asbestos Roofing for skeleton frame structures. Johns-Manville Mastic Flooring, Waterproofing, Asbestos Siding, Transite Asbestos Wood, Keystone Hair Insulator.*

JOHNS-MANVILLE SERVICE
COVERS THE CONTINENT

JOHNS-MANVILLE
Building Materials

WEATHER:
Always warm in winter and cool in summer if you are in a firesafe home, office or factory building.

The Fireproofing News

CONTAINING DETAILED DESCRIPTIONS OF NEW DEVICES AND APPLICATIONS OF MATERIALS WHICH ARE OF REAL VALUE IN FIRESAFE BUILDING: ALSO NOTES ON THE LATEST BOOKLETS, CATALOGS AND OTHER FIRESAFE LITERATURE, WITH OTHER ITEMS OF INTEREST TO THE FIREPROOFING FRATERNITY

LATEST EDITION

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New York City, N. Y., November 1917

Priceless

EFFLORESCENCE ON FACE BRICK—HOW IT CAN BE ECONOMICALLY AVOIDED

PROBABLY one of the things most annoying to architects and owners of brick buildings constructed in recent years, says the *Medusa Review*, is the unsightly appearance of efflorescence on the brick every spring, in some cases completely covering the upper stories.

It has been noticed that this is more pronounced under the copings, sills, belt courses, etc., or wherever a part of the building has been subjected to a greater wash by water. This indicates that the mortar, as well as the brick, is absorbent, causing the walls to become thoroughly soaked during the winter months, while the warm rays of the sun attract the moisture to the exterior, bringing with it the lime, magnesia and alkali salts contained in both the brick and the cement mortar.

It is agreed by all interested in brick construction that both brick and cement mortar is absorbent, yet little has been done to overcome this objectionable, serious and dangerous obstacle. Hydrated lime will add to the plasticity of the mortar, increase the density, and, being a water retainer, will add crystallization when used in places where it is difficult to apply water at frequent intervals, but should never be considered as a waterproofing material. Tests have repeatedly shown that slabs containing ten per cent hydrated lime, when taken out of the water, after one hour will contain a larger percentage of water than a similar sample of cement and sand, yet on the surface the lime sample is apparently bone dry.

The best-known solution of the above problem, which has withstood a test of over two years, having been adopted in the construction of a prominent eastern college, is as follows:

Impervious Cement Mortar to Consist of

One part approved Portland cement.

Three parts sharp, clean sand, showing not over thirty-five per cent voids by water.

Ten per cent of weight of the cement of hydrated lime (sufficient to add to the plasticity of the mortar, and retain enough water to perfect crystallization).

Two per cent of weight of the cement, Medusa Paste Waterproofing. Each gallon (8 pounds) to be mixed with equal parts of water, later adding twenty more gallons. All mortar to be gauged with this solution.

If the sand is damp, a one to fifteen solution should be used to offset the moisture already in the sand.

All exterior brick and stone work to the depth of 12 inches should be embedded in this mortar.

The extra cost of waterproofing the cement mortar will not exceed $1 per M bricks.

◆

POPULARITY OF ASPHALT SHINGLES

Although but a few years have elapsed since the commercial introduction of asphalt shingles the manifold advantages of the product over the wooden shingle, gained for them almost instant popularity, until to-day asphalt shingles are known and favored in almost every city and town throughout the country.

Asphalt shingles are made in a variety of styles and at prices to meet the various purchasing ability of prospective buyers.

Not the least noteworthy feature of the asphalt shingle is its fire-resistive quality, the value of which has been proven in innumerable instances.

OFFICIALS OF PORTLAND CEMENT ASSOCIATION

B. F. Afflect was re-elected president of the Portland Cement Association, at the latest annual gathering of the organization. Mr. Afflect is head of the Universal Portland Cement Company, of Chicago, and is identified with a number of other large industries of various kinds.

Other officers of the association chosen were: F. W. Kelly, president Helderberg Cement Company, Albany, vice-president; Richard Hardy, president Dixie Portland Cement Company, Chattanooga, second vice-president; G. S. Brown, president Alpha Portland Cement Company, Easton, treasurer.

The Portland Cement Association is one of the most efficiently conducted trade organizations in the country, and has contributed powerfully to the great popularity that concrete has attained in construction work in recent years.

By means of branch offices strategically located, and under the management of trained engineers, the association is enabled to keep in close touch with building operations everywhere in the States, and the counsel and further aid of its staff is at the service of architects, engineers and property-owners.

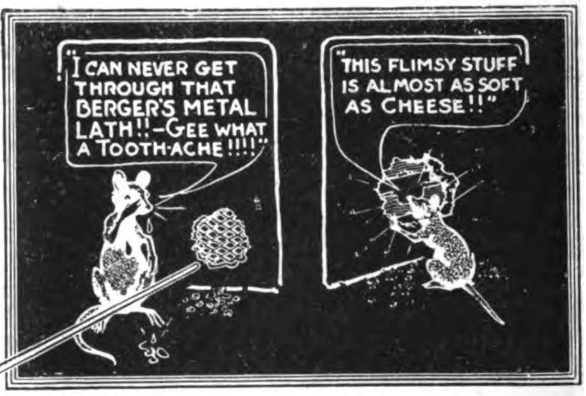
A further avenue of great usefulness is its publication of pamphlets and booklets, dealing with various phases of concrete work, the net effect of which has been to greatly stimulate the use of the product sold by the members of the organization.

◆

With a capital of $200,000, the Tongue and Groove Brick Company, of Wilmington, Del., was lately organized.

◆

The National Mosaic Flooring Company, of Mobile, Ala., is succeeded by the National Mosaic Tile Company, of the same city. The new interests plan an aggressive business-getting campaign.


I CAN NEVER GET THROUGH THAT BERGER'S METAL LATH!!—GEE WHAT A TOOTH-ACHE!!!!"
"THIS FLIMSY STUFF IS ALMOST AS SOFT AS CHEESE!!"

Blackboard talks by the professor

No. 4—
"Metal Lath Is Vermin Proof"

"WITH wood lath construction, there is always danger of rats and mice gnawing holes thru the walls and making passageways for themselves to all parts of a building.

"These vermin not only are destructive to property, but are positively dangerous to the health of the occupants as they are carriers of diesase. But

Berger's Expanded Metal Lath

partitions and walls will not harbor these pests as there is no possibility of them being able to gnaw thru the construction.

"This feature will appeal to every building owner, as the positive elimination of troublesome vermin from a building cannot be overlooked.

"Then, remember the other advantages of Berger's Expanded Metal Lath. It adds strength and rigidity to a building, saves maintenance expense, is fire resisting, keeps plaster from cracking and falling, permits immediate decorating, muffles sound, and is easily and quickly applied.

"Use Berger's Expanded Metal Lath in your next building."

Write for Metal Lath Booklet F. C.

The Berger Manufacturing Company, Canton, Ohio

Branches: Boston New York Philadelphia Chicago St. Louis
Minneapolis San Francisco
Export Dept.: Berger Bldg., New York City, U. S. A.

STANDARDIZING THE SELECTION OF CONTRACTORS

The record made in the construction of the cantonments for the training of Uncle Sam's army will no doubt have far-reaching consequences in setting the pace for a more business-like selection of contractors, and displace to a large extent the "lowest bidder" principle.

In the words of Major Starrett, of the architectural firm of Starrett & Van Vleck, who had charge of this part of the work, Uncle Sam did not select the contractors—they selected themselves.

They were picked out from those available by automatically determining their eligibility on the basis of merit according to the following rules:

1. The contractor must have given practical proof of his fitness by a record of at least two years' successful experience in the contracting business.

2. This experience must consist of single contracts at least three-quarters as large as the contracts under contemplation, or at least exceeding $500,000.

3. He must possess a plant suited for such work.

4. He must have an adequate organization for it.

5. He must prove that he can conduct such work under an accounting system satisfactory to Government auditors.

6. He must submit a sworn statement of the contracts he has performed during the past two years, giving names and addresses of owners, engineers and architects he has served, together with satisfactory references covering at least 25 per cent of the contracts represented in the sworn statement.

IN THE INTEREST OF THE TILE BUSINESS

Tilecraft is the title of an attractive little publication issued by the Associated Tile Manufacturers, in the general interest of the tile business. The matter in the initial number, both as to text and illustrations, is well selected and will be found not only of interest but of positive help. The avowed purpose of the association organ is to advocate "better and sounder business methods, superior workmanship and persistent effort in behalf of tile." It further "means to foster and expedite close relation and co-operation between dealer and dealer on the one side and manufacturer and dealer upon the other."

To develop its brick and tile business, the Kalona Clay Company, of Kalona, Ind., will issue an additional $200,000 of bonds.

THE IDEAL FIRE-PLACE

WE know what a fireplace is, but just what may be expected of it from the standpoint either of art or utility apparently remains in deep question. Basing our judgment upon ninety-nine out of a hundred fireplaces, the question might be answered adversely to the fireplace.

I shall, however, disregard both precedent and practice and knowing full well that the goods can be delivered, venture the following apparently rash assertion as to what the fireplace should be.

The fireplace may be constructed permanently, to work without smoking, to give real marrow-warming heat, to fit properly into the decorative treatment of the room, to harmonize with the color scheme, and, in short, to be a joy forever.

To the owner, such a fireplace would mean that he could settle down to that degree of comfort, security and restful quiet which only a good fireplace can give. He could know that his ten dollars worth of cord wood might return him ten dollars worth of heat; real surrounding heat; not the kind which scorches the shins while shivers play up and down the back. He would feel that it represented his taste and personality and in time it would become a part of him; a symbol in a way of his home—his fireside. He would be proud to invite his friends to see it; to partake of its warmth; to indulge with him in the happy reflections which it inspired.

Shows Skill of Architect

To the architect such a fireplace would mean a lasting evidence of his mechanical ability, of his knowledge of construction and design, and a proof of his sound and sensible choice of men and materials. Often the fireplace presents the one possibility of an architectural feature in the home; the one permanent piece of furniture installed by the builder. Thus it should represent in an intimate way the architect's sympathy with the owner's need, as well as his originality in design, sense of proportion and knowledge of detail and color.

It requires no great degree either of knowledge or ability to produce a mantel from the brickmaker's catalog, or better still, to imitate or reproduce a Tudor stone mantel or a marble one of Old Florence. To know the underlying principles of design upon which the success of each period was founded, and then apply them to present day materials and present day problems, indeed proves the highest degree of knowledge and artistic skill. It is much easier to fall into traditional tactics than to explore and apply principles to new problems. It is easier to take the first comer or lowest bidder than to pick and choose and insist on the owners employing a man who will provide properly and produce results, forestalling future trouble.

Such a fireplace as our ideal requires first a high type of integrity in furnishing the best materials and best methods of construction. It requires constant study of available materials and their wearing qualities under various conditions.

On the designer's part it calls for a knowledge of the finish, texture and colors available and of utmost importance, a knowledge of the ability of the manufacturer to produce the required results. A factory which would make a success of a large order for glazed material might make a sorry failure of such a mantel as shown in the special design, and vice versa.

Extensive study of the constructive elements, fireback, soffit, throat and flue, and the many details of size and proportion, would be essential to the builder of our ideal fireplace, and, finally, the experience gained by the practical working out of many fireplaces and a record of past results.

Thus we see that the problem is really a deep one, one in fact which requires the co-operation of the owner, the architect, and a practical student of the design and construction of fireplaces.

Such a service may find up-hill work against present day practice in building construction. Nevertheless, a man buys the best suit he can get from his tailor; a suit which he will cast aside shortly; why should he be recommended or forced to use the cheapest material he can find for his fireplace and to have it built by the lowest bidder; an object which will be constantly before him, his family and his friends, and one that will outlast his house.

Duty of the Tile Dealer

The tile dealer who takes the opportunities offered him by the architect to get rid of his old stock or dispose of the cheapest material at the biggest price, is penny-wise and pound-foolish. It is for such an emergency that he should be prepared to offer something worth while, to enlist, if necessary, the co-operation of a designer of fireplaces and thus offer to the architect or owner something worth while and which will compel further orders.

That the fireplace has survived as much abuse, both in the way of design and construction, as it has received in times past is sufficient evidence of its importance. In the years to come, as more knowledge and greater thought is given to it, it will again find its place of primal importance; as the heartside, the shrine of the home.

To build a perfect fireplace is to build a monument to art and craftsmanship; it is life to the heart of a home and a permanent heritage of comfort, warmth and peaceful reflection.—*Eri H. Richards in "Tilecraft."*

◆

TO MEET IN INDIANAPOLIS

Members of the American Ceramic Society have been notified that the twentieth annual meeting of the organization will be held at Indianapolis on February 11th, 12th and 13th next. As "a number of vitally important matters concerning the future of the society are likely to be brought up for consideration at the meeting," an unusually large attendance is urged.

◆

The Dealers' Cement Corporation, recently formed at Syracuse, N. Y., has arranged for the erection of an extensive manufacturing plant at Phelps, N. Y. The plant will have an annual capacity of 1,000,000 barrels, and has already been assured of the sale of a considerable part thereof.

◆

Bird & Low, of East Walpole, Mass., have added to their already extensive facilities for the manufacture and sale of firesafe roofing and allied products through the purchase of the plant of the Reckitt Corporation of Chicago. The absorbed concern had an up-to-date roofing manufactory, and controlled a wide sale of prepared roofing, wall board and building paper, in addition to asphalt shingles.

◆

A new corporation at San Antonio, Tex., is the Elgin Brick & Tile Company, capitalized at $100,000.

She: "If we must cut down expenses, why not drop your life insurance?"
He: "Not much. That's *your* insurance, not mine. I figure we can trim about all the other items so as to save at least $400 a year, and I'm going to take a hundred of that and buy another Postal policy while I can get it. You and the kiddies may be glad some day."
She: (thoughtfully) "I guess you're right at that, Jim."

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for

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COVERS LARGEST DYE PLANT IN AMERICA

A folder circulated by the Barrett Company, of New York city, illustrates the recently completed plant at Buffalo of the National Aniline & Chemical Company, Inc., "the biggest concern in the American dye" industry."

Designed and constructed by the John W. Cowper Company, of Buffalo, all buildings in the plant were roofed with Barrett product, laid according to its specifications, and carrying with it a 20-year surety bond guarantee. A photographic reproduction of a cross-section of the roof supplies the answer as to how the company can guarantee its product for so long a time.

◆

Those familiar with the peculiar merits of the steel cabinets produced by the Safe Cabinet Company, of Marietta, Ohio, will readily accept the statement of its management that the sales of the company thus far in 1917 have "about doubled" over those of the same period last year. To take care of the great increase in business large factory additions have been made, which are rapidly nearing completion. "New and improved machinery is sending a whirr of extra energy through the plant. Restless engines are delivering huge quantities of raw materials. A night force of expert mechanics is reporting for duty. A new production record has been set and every effort is being bent towards its fulfilment.

Standing every test the product of the Safe Cabinet Company deserves its widespread and ever-growing popularity.

◆

T. L. SMITH COMPANY'S NEW MIXER

A notable feature of a new mixer put upon the market by the T. L. Smith Company, of Milwaukee, Wis., is an underslung chain drive. The chain, instead of passing around the mixer drum, goes under the truck frame, around an idler pulley on the roller shaft, and back under the drum. This not only permits the use of a shorter chain and decreases the friction, but the chain, being in contact with fewer teeth, is less likely to ride off.

Another new feature is a self-locking discharge chute designed to eliminate the tendency of the concrete to flip the chute when falling upon that portion of it inside the drum. The chute is simply inserted in the drum, and the toggles automatically lock. It can be operated from either the feed or discharge side.

The machines are furnished with a power charger or a charging platform 18 inches high, which can be removed or hooked up in a vertical position. They are equipped for either steam or gasoline power.

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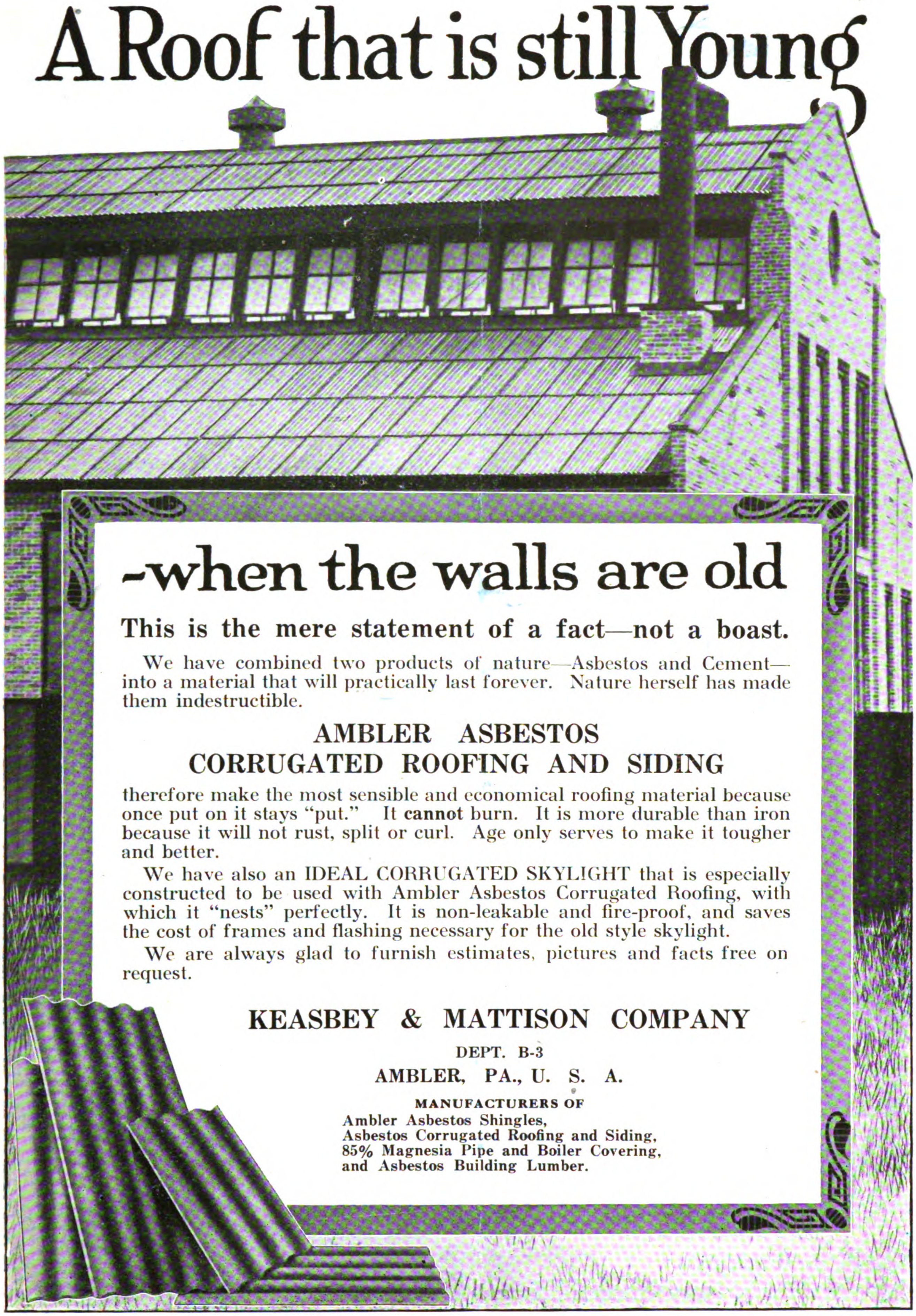

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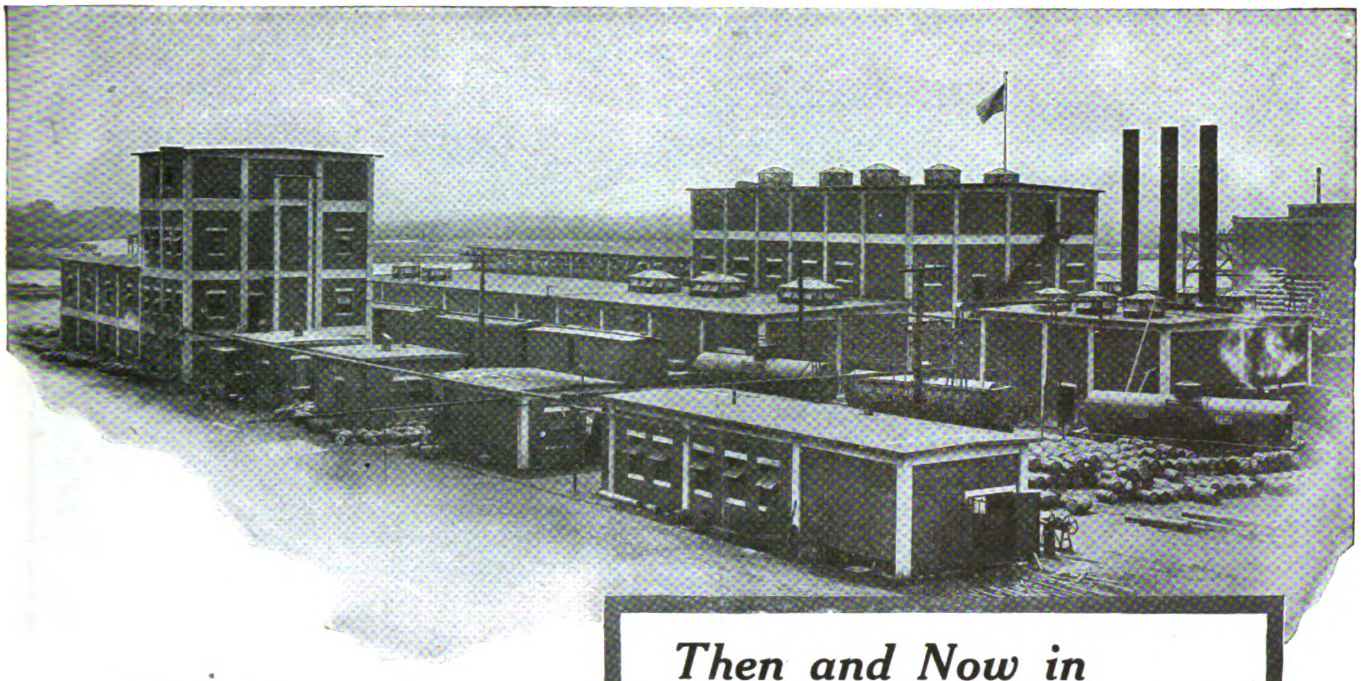


Fireproof Plant of the Borne Scrymser Company of Elizabethport, N. J.

This industry involving great fire hazards built fireproof of NATCO Hollow Tile curtain walls supported on a reinforced concrete skeleton, because it was altogether the most economical, attractive, and serviceable type of construction. NATCO Hollow Tile units eight inches thick and eight inches high by twelve inches on the face, smooth inside and outside, and glazed for a finished wall surface are used in nine buildings, large and small, shown in the above illustration.

Then and Now in Factory Construction

YEARS ago, it was customary to build a factory of wood.

Then—after a comparatively short period of service—the walls began to bulge and the roof would sag—finally collapsing—despite the efforts of an efficient and ever-ready repair gang.

Costly mistakes, weren't they?

Nevertheless, future generations will profit by the lessons learned, because architects and builders now realize that building once for all time is true economy.

Today the architect wants to design a building that will stand without repairs—he specifies materials that are firesafe.

Again and again he turns to NATCO Hollow Tile, because it's time tested.

From skyscraper to bungalow, NATCO has proved its worth and efficiency as an ideal building material.

NATCO is firesafe, weatherproof and everlasting.

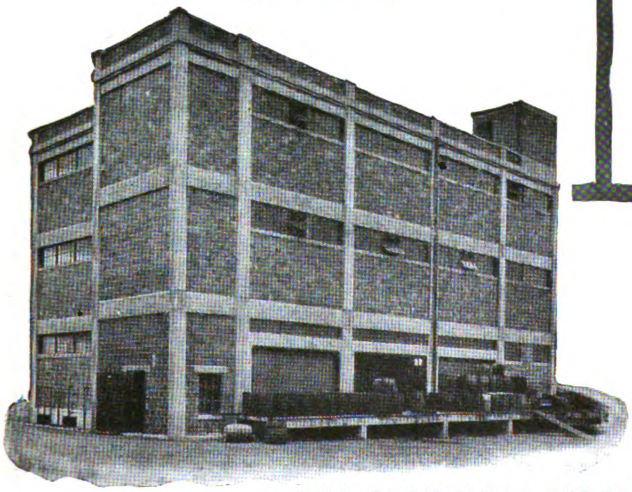
"Reason-why" information may be found in NATCO literature bearing upon modern fireproof construction.

Call on our Free Service Department. It can assist you in solving your fireproofing problems.

Store House, Standard Oil Company, Lakeview, N. J.

One of several buildings in which smooth unglazed NATCO Hollow Tile was used by a big corporation that uses keen foresight in all its business dealings.

Note the excellent scale of the design. The tile units are 8 inches thick in the wall and eight inches high by 12 inches long on the face.



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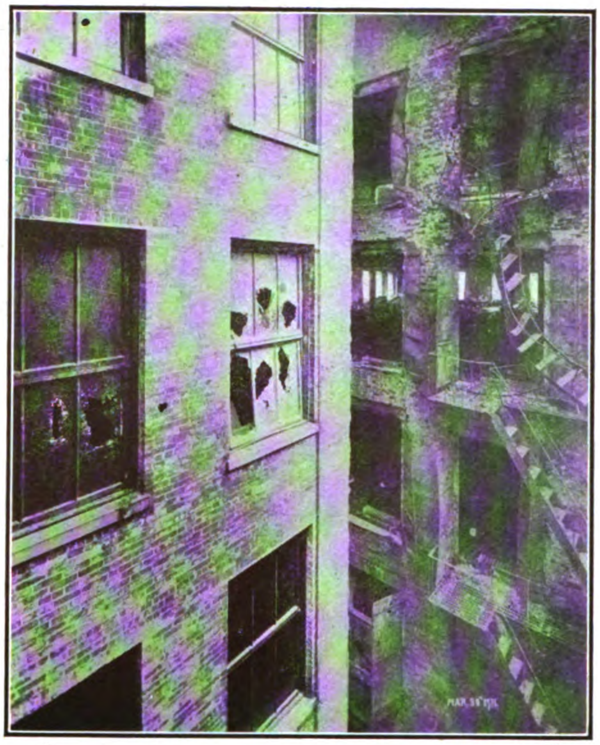

Note the holes punched in the "Wire Glass" windows by the firemen to enable them to fight the fire in the Asch Building from the interior of the adjacent fireproof building, the "Wire Glass" windows acting as a fire shield.

THIS age of Fireproof Construction compels us to be familiar with materials which are approved Fire Retardants.

Of most importance is the question of properly protecting window openings. Wooden frames and window glass or plate glass have proven a failure. What else is there to do?

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CONSTRUCTION
ADVOCATING THE CONSISTENT USE OF
FIREPROOFING MATERIALS & PROTECTIVE DEVICES

VOL. V DECEMBER, 1917 No. 6

Indianapolis Considering Roofing Ordinance

INDIANAPOLIS, IND., is now giving serious consideration to the matter of a new roofing ordinance and is collecting data upon the subject from sources of value. It is to be hoped that as a result of their inquiry the commissioners will recommend an extension of the present fire limits of the city, and the complete prohibition of the wood shingle menace.

Liable for Damage to Neighboring Property

IN connection with the many efforts being made to reduce the appalling fire waste of Canada, says the official organ of the Canadian Manufacturers Association, it has been suggested on various occasions that legislation should be enacted making a person liable for damages to his neighbor's property resulting from a fire spreading from his own premises, where such fire is the result of his negligence or that of his servants. It is perhaps not commonly realized that the enactment of such legislation is unnecessary as, under existing laws, a person is actually liable for damages to the property of others arising through his negligence.

The principle is sufficiently well known in relation to practically every other kind of damage except that resulting from communicated fire. Even in this connection, it has long been a recognized theory in the Western Provinces where a man is liable for damage sustained by his neighbor's property resulting from prairie fires caused through careless burning of stubble, or other negligence. The fact that actions of this class have hitherto been extremely rare in Canada is doubtless principally owing to the payment of losses by the insurance companies and the resulting lack of interest on the part of the assured. There is, however, no reason why damages should not be claimed under common law. If, for instance, the occupant of a building caused a fire on his premises by placing hot ashes in a wooden receptacle, and the fire spread to an adjoining building, the neighbor would undoubtedly be in a position to recover.

Need for Tenement House Supervision

THAT a positive need exists for the adoption and proper enforcement of legislation governing the construction of tenement houses in New York State, was attested by the complete collapse of one of these structures in this city a short time ago; fortunately without loss of life.

When the statute providing for the supervision of buildings was adopted by the State Legislature a few years ago, the clause relating to tenement house construction was stricken out, against the protest of many familiar with general building practice. The result has been the erection of many structures by men who have no practical knowledge of the business, and who resort to the vicious policy of "farming out" a contract—in a recent case this was carried to the extent of giving separate agreements to parties supplying the brick, mortar, angle irons, laying the brick, etc.—with the inevitable result that when difficulties were encountered it was impossible to fix the responsibility.

Of equal importance with the passage of necessary legislation is the matter of its enforcement. If this latter is to be left to men whose sole qualification is their political pull, it is worse than useless, for it gives a false sense of security to property-owners who might otherwise look after the matter themselves or employ competent parties to do it for them.

Would Encourage Fire-Resistive Building Construction

IN the opinion of a special committee named to study the fire waste of the Province of Ontario, and to suggest means for its reduction, the following among other measures should be adopted:

"There should be prepared a standard building code, modelled after the one brought out by the National Board of Fire Underwriters (Chicago), but suited, of course, to conditions prevailing in Ontario, and all municipalities within the province should be urged to adopt same, to the end that fire-resistive building construction may be encouraged, that adequate exit facilities from buildings may be assured, and interiors so designed and fire-stopped as to make easy the extinguishment of the fires therein.

"The wider use of the automatic sprinkler as a fire-extinguishing agent and life-saver, and the more general adoption of the fire division wall as an important life-saving exit facility, should both be encouraged in some practical manner beyond the incentive offered by lower rates of insurance."

Size Standards and Terminology for Face Brick

RECOGNIZING the legitimate demand on the part "of the architect, contractor and brick manufacturers for the adoption of definite standards of size and terminology" in the use of face brick, the American Face Brick Association at its latest annual gathering, unanimously adopted the following:

Standard Size

(A) The *"standard"* size of face brick shall be approximately as follows: 8 in. by 2¼ in. by 3¾ in.

(B) In referring to the size of a face brick it is desirable that the three dimensions be stated in some definite order for the sake of clarity and uniformity. As the length and thickness of the brick are the dimensions most often appearing on the face of the finished wall, the length shall be stated first, the thickness second and the width last, thus, 8 in. x 2¼ in. x 3¾ in.

(C) This "standard" size shall apply to brick burned to average hardness, with allowance for the usual commercial variations from such dimensions in brick harder burned or softer burned than the average.

Standard Terminology

(A) *Type or Method of Manufacture*:

Stiff Mud Wire Cut—A brick made by wire cutting, into brick sized units, a column of stiff plastic clay expressed through the die of an auger or plunger machine.

Stiff Mud Repressed—The above brick after being repressed in a press box.

Dry Pressed—A brick manufactured of finely ground, dampened clay, pressed in a press box.

Soft Mud—A brick made of clay mixed with water to a comparatively soft consistency and moulded directly in a mould, usually without repressing.

(*B*) *Texture*:

Smooth—A brick of any of the above types and having a relatively smooth surface on its face and heads.

Sanded—A brick coated with sand.

Water Struck—A brick of the soft mud type moulded in a mould dipped in water. This brick is often hand moulded and in any case is irregular in size and surface.

Rough, Vertical Texture—A brick having an artificially roughened surface with ridges and valleys extending in a vertical direction when the brick is laid horizontally in the wall. This brick is usually, but not necessarily, of the stiff mud wire cut type.

Rough, Horizontal Texture—A brick having an artificially roughened surface with ridges and valleys extending in a horizontal direction when the brick is laid horizontally in the wall. This brick is usually, but not necessarily, of the stiff mud wire cut type.

(*C*) *Color*:

The colors most used in the face brick business are red, buff, gray, iron spot and manganese spot. These names are self-explanatory.

In addition to the colors themselves the following expressions are in common use:

Clear Color—A brick with a clear color and without flash.

Fire Flashed—A brick which has been subjected to a "reducing" action of the fire thereby bringing out the iron in the clay and producing darker colors on the faces and heads of the brick than is produced in the interior of the brick, i. e., a color skin deep only.

Cost of a Roofing

SLOWLY but surely, says "The American Roofer," the property owner is coming to a realization of the fact that the real cost of a roof is measured by service and not by first cost of materials and labor. Even now we see buildings advertised for sale with a significant statement in the ad. that the roof is of such and such quality. It means that the prospective buyer is assured that he need not renew the roof every few years; it means, too, that emphasis is being put on the durability of roofs rather than on their cheapness.

Time is a great worker of revolutions, and in the roofing business time is the tester of reputations. Given sufficient time and it will be possible to tell which kind of roof lasts the longest, and then we shall have roof values measured by years of service, as they should be.

In the present-day rush of building activity too much attention has been paid to getting something quick and cheap and not enough to durability. All this is changing for the better; and the manufacturer who puts quality into his roofing materials is going to go along with the tendency of the times—toward better roofs.

Explosion and Fire Takes Heavy Toll at Halifax

ONE of the greatest disasters of modern times occurred at Halifax, N. S., on December 6th, when close to 2,000 persons were killed, many others seriously injured, and property damage running into millions of dollars, through the explosion in the cargo of a heavily laiden ammunition carrying vessel anchored in the harbor.

Virtually the entire north end of the city, and portions of communities across the bay, were laid waste, fire completing the destruction of the buildings after their wreckage by the explosion. To add to the sufferings of the sorely stricken people, a snow storm of blizzard proportions developed later in the day, hundreds dying through exposure to the intense cold.

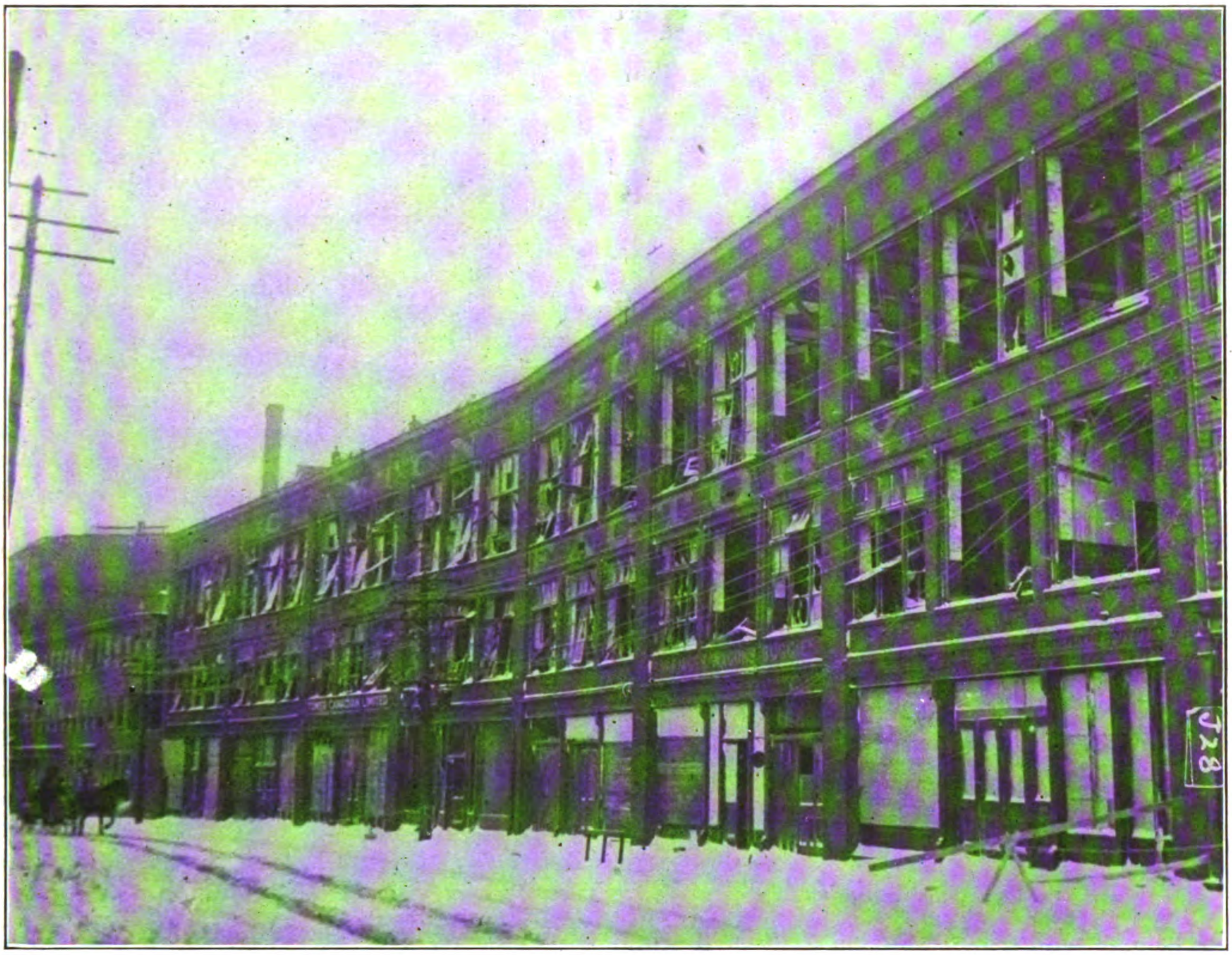


Photo Copyright by Underwood and Underwood, N. Y.

Business Block in Halifax Wrecked by Explosion—Note the Complete Destruction of the Windows and the Serious Manner in Which the Interior Construction Was Shaken.

Prompt investigation into the disaster was begun under Government direction, the result of which had not been made public at this time of writing.

Unofficial accounts state that the business life of the city had just begun for the day when the town was shaken to its foundations by the explosion. Persons in the streets were picked up bodily and hurled to the ground. Occupants of office buildings cowered under a shower of falling glass and plaster. Houses in the Richmond section crumpled up and collapsed, burying their tenants.

In the main part of the city, where the buildings are chiefly of stone or concrete, the damage was confined to the shattering of windows and most of the casualties in this section were caused by flying glass.

In the west and northwest ends the damage was more extensive and there the walls of many houses were blown to atoms. It was in Richmond, however, opposite the scene of the explosion, that the havoc was greatest. Whole blocks of dwellings, mostly of frame construction, were leveled.

Impossible to Check Fires

Street after street is in ruins and the structures which were left standing by the explosion were destroyed by fires which broke out simultaneously in a score of places and which it was impossible to check until they had burned themselves out. It is believed scores of persons who had been injured by the collapse of their homes perished in the flames from which they were helpless to flee.

Five minutes after the explosion the streets in all parts of Halifax were filled with frenzied, panic stricken throngs striving to reach the outskirts in an effort to escape what they believed was a raid by a German fleet. Hundreds of them had been cut by the shower of glass which followed the explosion.

In the Richmond section the scenes enacted defied description. Seriously injured men and women crawled from the wreckage of their homes and lay in the streets until they were removed in ambulances and automobiles to hospitals. Those less seriously hurt aided those more gravely injured. In the streets, piled high with debris, were found the shattered bodies of many women and children. Several children were crushed to death when they were hurled against telegraph poles by the force of the explosion.

In scores of cases occupants of houses who had escaped without injury or who were only slightly hurt were baffled by the flames in their search for members of their families and were forced to stand by impotent while what once had been their homes became funeral pyres for loved ones.

The force of the explosion was felt at Truro, 75 miles away, where windows were shattered. All telegraph and telephone wires were torn down and for several hours Halifax was completely isolated from the outside world.

The concussion shattered the big gas tanks of the city. All power plants are out of commission and newspaper offices have been so badly wrecked that publication is impossible.

Building Construction of City

Late in 1916, engineers of the National Board of Fire Underwriters upon request of the Nova Scotia Board of Fire Underwriters, investigated Halifax from a fire resistance standpoint.

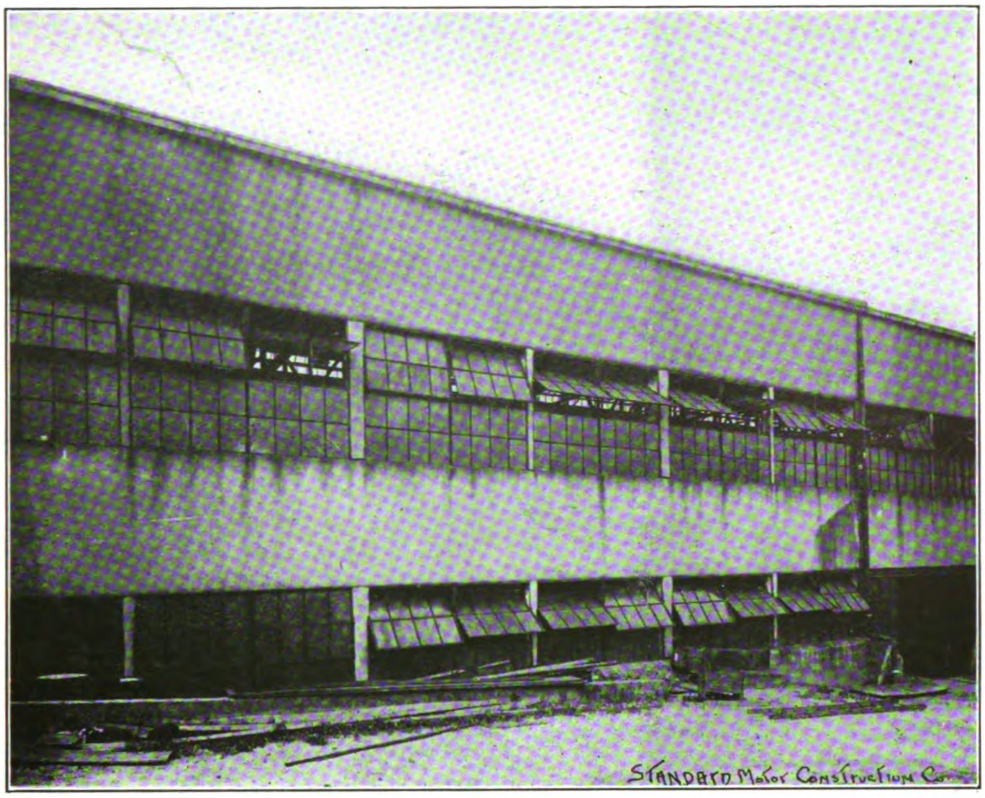
From the report we learn that in the principal mercantile district: "Exposures on the south are moderate; on the west and north the exposure by compactly built minor mercantiles and dwellings, mainly of frame construction, with many shingle roofs, is augmented by a seriously deficient water supply, and is severe; and on the east the large amount of frame construction with large areas and many shingle roofs forms a very serious exposure. There are nine fireproof buildings in the district but their combined area is only 3.7 per cent. of the total building area and owing to their location would act only as local fire barriers. Frame construction is found in all but five of the blocks and covers nearly one-third of the area built on; it forms more than one-third of the construction in ten blocks and more than two-thirds in three blocks; 18 per cent. of the buildings have shingle roofs.

"Outside the Principal Mercantile District.—Wharf and warehouse district extends along the harbor front from Fawson street to the railroad yards at the foot of Proctor street, and is bounded on the land side by Water street. On the street frontage from George to Proctor street there are numerous minor mercantile occupancies in buildings mainly of frame construction and three stories in height; a few buildings are of stone or joisted brick. Along the water front construction consists of low frame dock property with slips between adjacent docks; at times the pier sheds contain very high values in transit. Over the rest of the district the buildings are largely of frame construction from one to four stories in height, with many shingle roofs and large areas; a few buildings are of better class of construction and there are four sprinkler equipments. At the southern end is the electric power plant and carbarn; the other occupancies include many fish receiving and curing warehouses, lumber and coal storages, freight sheds and wholesale grocery and liquor warehouses. The potential hazard of the district is high on account of the large amount of frame construction but the accessibility is good in most places. The lack of sufficient water supply from the municipal system and of a boat with a fire pump, and a weak fire department makes the probability of spreading fires high.

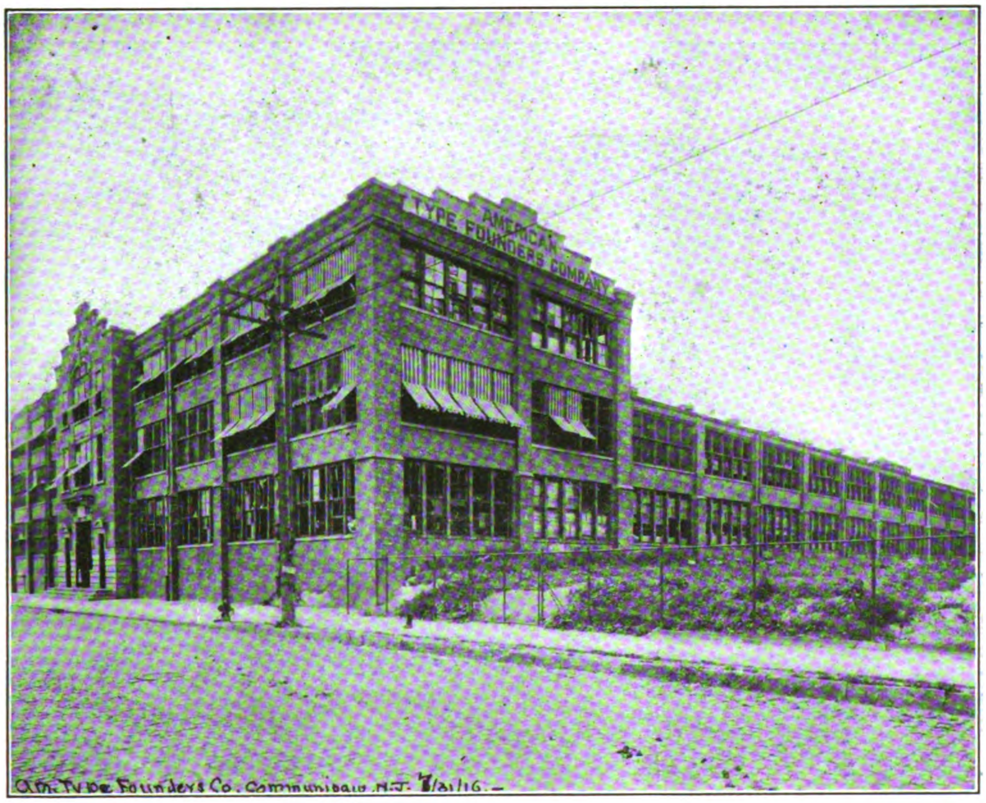
"The few manufacturing plants are scattered and only individual factory fires are probable. Residential sections are mainly frame and shingle roofs, and though most of the dwellings are detached, some are in frame rows and there is the liability of extensive fires because of the shingle roofs.

"Conclusions.—In the principal mercantile district there is much frame construction and nearly all the rest is structurally deficient joisted brick; streets are narrow, there is little vacant space in block interiors and the fire-fighting facilities are inadequate; because of these conditions the probability of a conflagration is high. The large amount of frame construction in the wharf and warehouse district coupled with the lack of good fire protection makes sweeping fires probable. The manufacturing plants are subject only to individual fires. The minor mercantile district has little barrier to the spread of fire and serious fires are probable. In the residential sections the usual hazard of frame dwellings with shingle roofs is present."

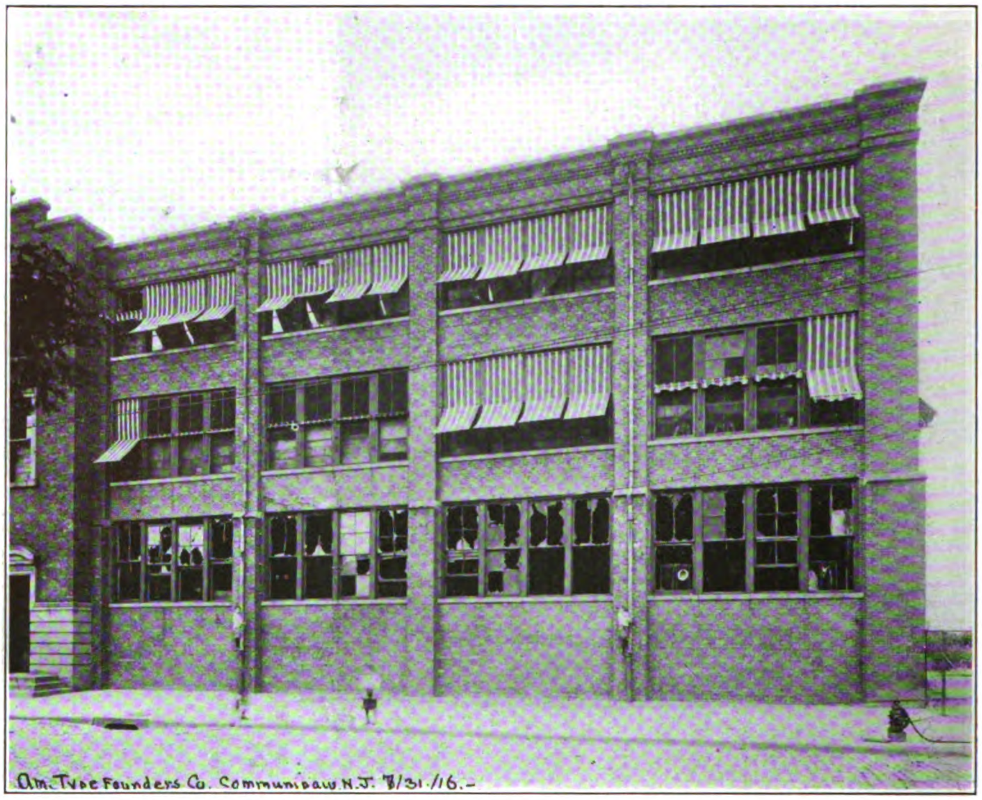
(Continued on page 229.)



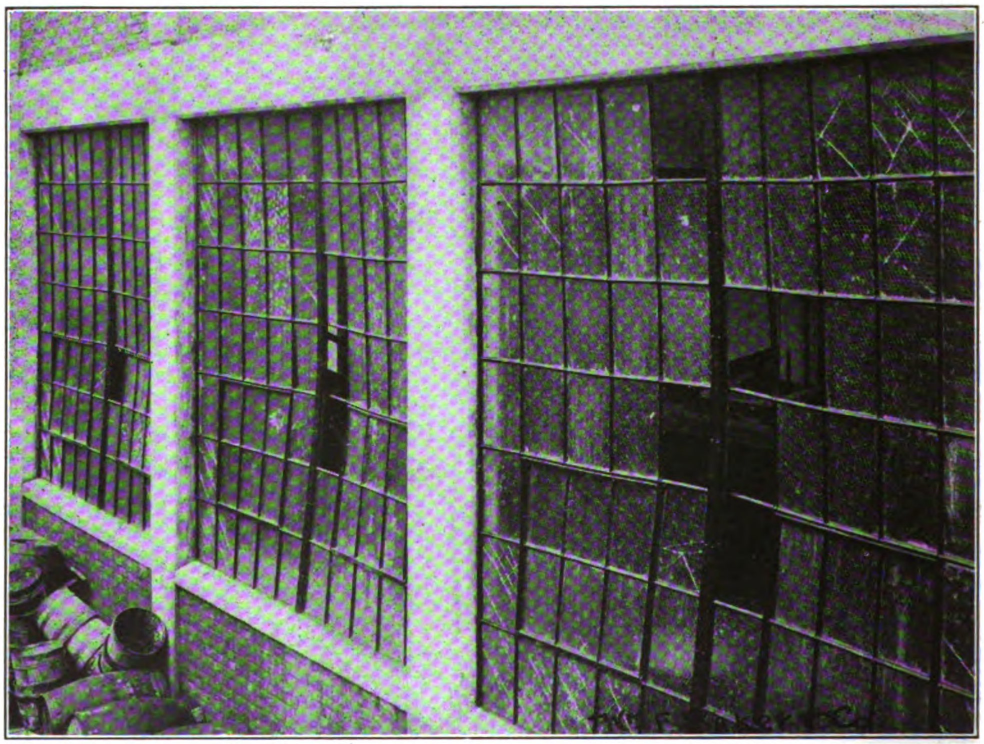
Plant exposed to brunt of Black Tom Island explosion. Its wired glass windows, though cracked, remained intact, protecting contents of building from fire or driving rain and—


AMERICAN TYPE FOUNDERS COMPANY
Am. Type Founders Co. Communipaw N.J. 7/31/16.

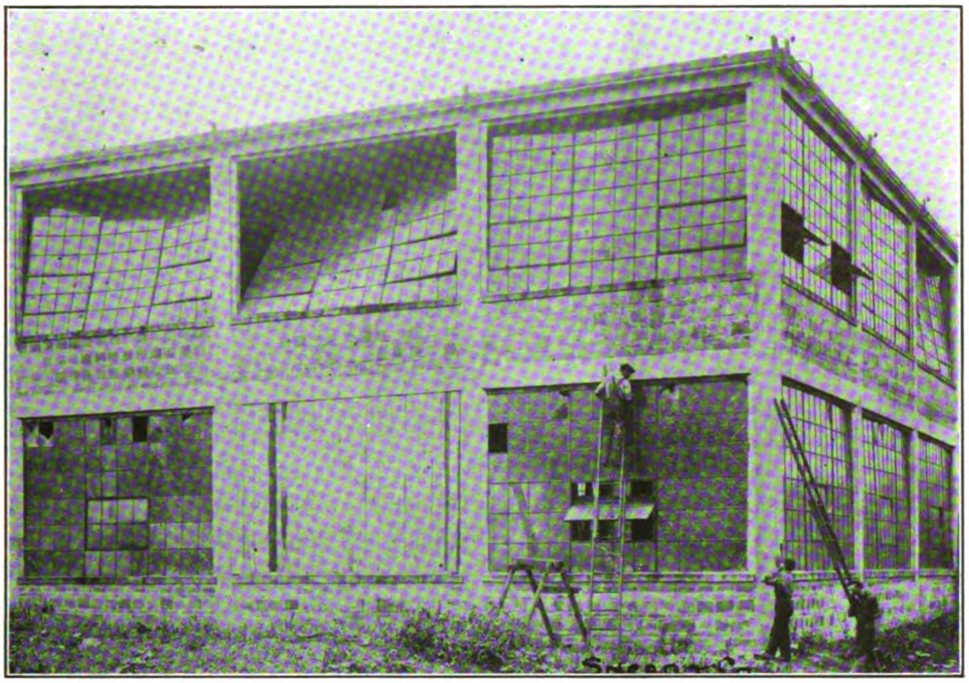
—a building nearby equipped with ordinary glass windows, encased in wooden frames. Result—the glass blown out, and some frames destroyed.



Another view showing the inability of ordinary glass fronts to withstand shocks of any kind in comparison—



—with the admirable results afforded by wired glass set in steel sash.



Although several steel sash in the Jersey City plant of the Snead & Company Iron Works were blown in as a result of explosion, the wired glass held intact, enabling speedy and economical repairs.

EXPLOSION AND FIRE TAKE HEAVY TOLL AT HALIFAX

(Continued from page 226.)

From the newspaper accounts many of the most severe injuries to the citizens of Halifax and Richmond were caused by flying window glass released from their none too secure frames by the tremendous force of the explosion.

In marked contrast to the serious results of the disaster in this respect, it is interesting to note the manner in which wire glass encased in steel frames, installed in a number of buildings withstood the shock of the munition explosion at Black Tom Island, in New York harbor on July 30, 1916. While the concussion here was so severe as to shatter thousands of plate glass and ordinary window glass in New York City, five or six miles away, properties equipped with wired glass within half that distance of the scene of the explosion, easily withstood the shock, suffering but little damage. To what an extent this was true is shown in the accompanying illustrations.

Fortunately the Black Tom disaster occurred early in the morning, at an hour few people were about. Had it happened later in the day when business activity was under full headway, undoubtedly there would have been a severe loss of life.

The lesson of the explosion in both cases is the same, namely, the necessity for utilizing every possible safeguard in building construction, and particularly the wisdom of installing wired glass in approved metal frames. While the cost of such installation is initially considerably higher than that of ordinary glass, the better diffusion of light, greater safety and saving in repairs makes it far more desirable, and its use as a matter of public policy should be encouraged by municipal ordinances.

FOR the purpose of dealing collectively with organized labor in the building trades, the Material Dealers Association is being formed in Cleveland.

This organization will combine in its membership builders' supply and lumber dealers, mill operators, stone manufacturers, cement block makers, trucking companies—in fact, every interest engaged in the sale or delivery of building materials.

This association will give employers a centralized body similar to that of the building trades council, under which the various unions engaged in the building trades are grouped, and will enable them to deal in a collective way with the unions, instead of by groups as in the past.

The value of such an organization was impressed upon the employers last spring, when they were able effectually to combat the unions by concerted, but at that time, unorganized, effort.

Jointly Conducted Fire Tests of Building Columns

FIRE tests of building columns, being jointly conducted by the Associated Factory Mutual Fire Insurance Companies, the National Board of Fire Underwriters, and the Federal Bureau of Standards, at Underwriters' Laboratories, Chicago, are progressing according to schedule, two columns being tested each week. The work of testing began last Summer and will require a year for the completion of the full series of 100 tests. This was preceded by several years' work in designing and erecting the testing apparatus and in preparing and covering the test specimens by the different methods and with the various materials required for a full investigation.

The apparatus used in the tests consists briefly of a gas furnace capable of being controlled according to a specified standard temperature curve, reaching a maximum of 2,300 degrees Fahr., (1,260 degrees Cent.) at the end of an eight-hour test. The load on the columns while being subjected to fire test is supplied by means of a hydraulic ram, an average load of 100,000 pounds being maintained during the test, this being calculated for the various sections according to accepted formulas for working load.

The temperature of the column furnace is measured by means of platinum and base metal thermo-couples, supported in porcelain tubes at two elevations; and that of the columns, by means of base metal thermo-couples attached to the metal of the column at four elevations and at different points in the section. The temperature indications are read with a potentiometer indicator and connections are also made to an automatic potentiometer recorder, so that graphic records can be obtained, if desired, of the indications of any set of couples.

Measuring Compression and Expansion

The vertical compression and expansion of the columns, due to the load and heat, are measured over a gauge length of 37 inches in the upper half of the column by means of wires attached to the column at each end of the gauge length, the other ends being weighted and passed over an idler at a point outside of the furnace and as far from the column as room conditions will permit. The wires are protected inside and outside of the furnace by suitable insulating and protecting tubes. Readings of vertical movement are taken at intermediate points on the wires by means of microscopes mounted in micrometer slides, the true movement at the column being calculated from the distance relations of the microscopes and the fixed end of the wire, with reference to the point of attachment to the column. The lateral deflection of the column is measured by means of readings on scales placed perpendicular to and parallel with the wires.

All of the tests are of full-sized columns of 12 feet 8 inches effective length and of various steel sections, which are protected by concrete, tile and other forms of fire-protective coverings. One column of each type is tested unprotected; also several concrete columns reinforced according to methods used in current practice have been introduced.

The tests are continued to a break-down of the sample, and hence no inferences as to the comparative merits of the various column designs and column coverings should be drawn from the illustration, which show simply the effect of load and fire on a number of samples which have been subjected to test. The time required to obtain failure varies with the type of material and thickness of covering, the periods for the columns so far tested ranging from 17 minutes for the unprotected column to over eight hours for the heavier types of protection.

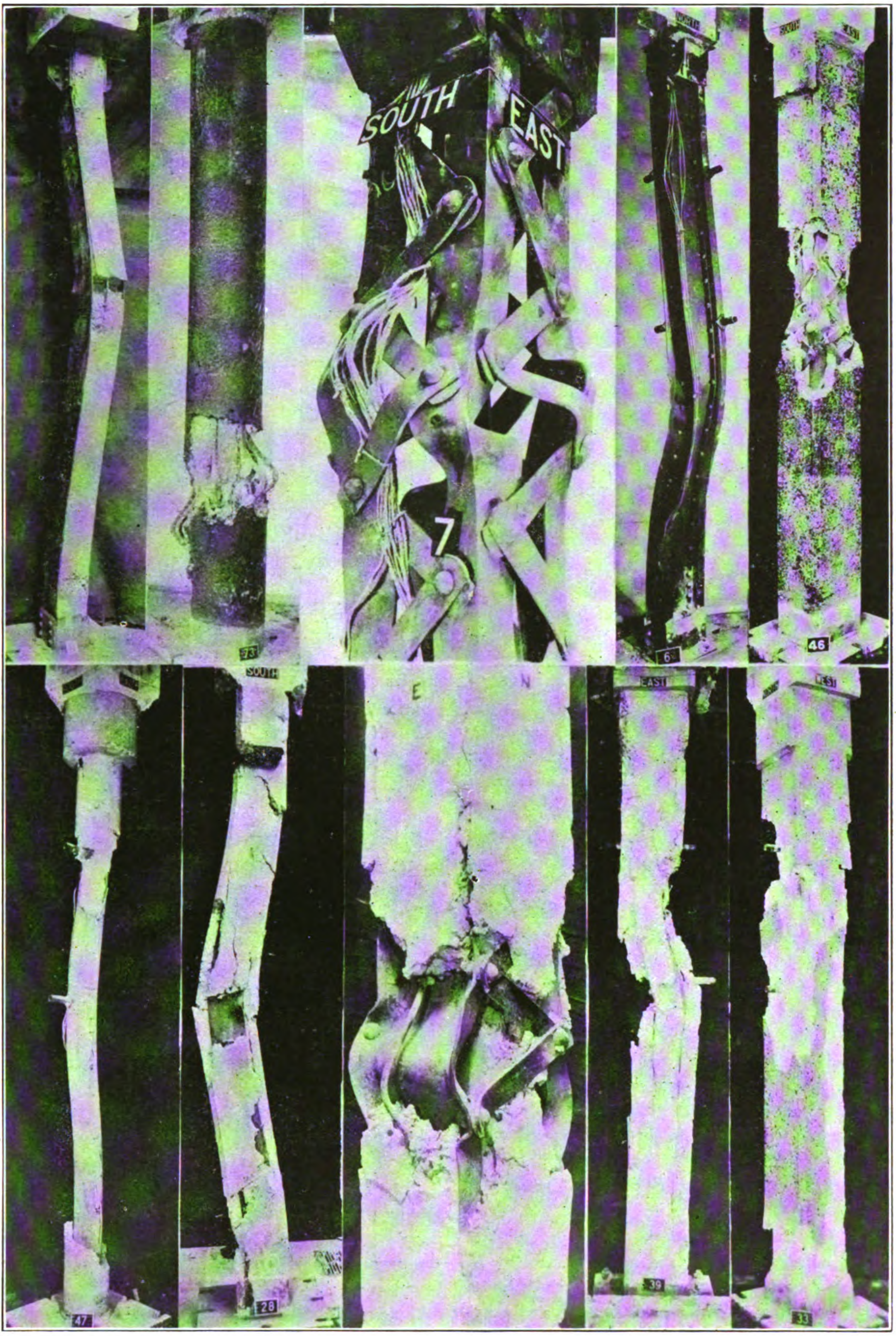
First Tests Ever Undertaken

This is the first work of this character ever undertaken employing modern forms of columns and methods of protection, and it is expected that it will develop data of great interest to city governments, underwriters, manufacturers, architects and engineers.

Specifications for columns and column coverings have necessarily been made ever since the advent of modern fire resistive construction, but there has been little or no experimental data as a basis for the various requirements promulgated, which in point of amount of protection required, differ by more than 100 per cent as between various city building codes.

It is also thought that the tests will give much information on the general fire-resistive qualities of the covering materials employed. Differences in point of effectiveness of over one hundred per cent. have already been found as between concretes made from different aggregates, some showing up unexpectedly well and others indicating decided unsuitability for use where the fire-resistive feature is a point of importance.

MEMBERS of the twenty-odd art and cultural societies of Chicago have been urged to affiliate with the Illinois Chapter of the American Institute of Architects the thought being "that great good to the architect and the community may result from a closer social relation of the architects with others interested in the arts and in sociological and governmental matters related to architecture."



Effect of Load and Fire on Building Columns as Shown in Tests Conducted at Underwriters Laboratories, Chicago.

Work of The British Fire Prevention Committee

A BRIEF summary of the work of the British Fire Prevention Committee since its organization twenty years ago until the present time, appears in a statement recently issued by the executives of the organization.

From the review in question we make the following quotation:

"Generally speaking, the Committee's work may be said to have comprised extensive research work, including many tests; the initiation of questions of legislation, by-laws, regulations, etc., with the necessary presentation of data and 'evidence' and the issue of extensive literature on the subject of fire prevention and extinction, known as the Committee's 'Red Book' and 'Journals'; the *preparation of* a number of notices and *circulars of a precautionary character,* the *collection* and exchange *of technical information* and its dissemination from the Committee's enquiry office; the *organization of conferences* and technical exhibitions, and, finally, a general propaganda through the press and elsewhere in the interests of fire prevention.

"It rests with others to appraise the effective results of the Committee's work within the Empire, but it is permissible to mention that *expressions of appreciation have been numerous,* and not least valued among them are those received from the different departments of the Government.

"The most competent authorities in the United States, France and Russia have been liberal in their praise, whilst authorities in enemy countries, in pre-War days, adopted the Committee's data and the conclusions drawn from its investigations. One thing however, might not be inappropriately mentioned, and that is that in the pre-War period there was not the least dispute that, although *the Committee's research work* on the fire question was carried on voluntarily and with limited funds, it was *far superior to anything that obtained in Germany or Austria* regardless of State aid. The authorities in those countries fully recognized this, and the Committee's work was largely acted upon and its reports translated. Further, *in international conferences* and gatherings of a technical character, so far as fire prevention was concerned, *the lead,* with its consequent control, *was in the hands of the British Fire Prevention Committee* from 1903 onwards.

The Committee and the Public

"*The Committee,* owing to the nature of its work, has *not been largely before the public.* Probably a very small percentage of the professional and commercial classes know of its existence, and, certainly, it is scarcely known to 'society' or the 'man in the street.' Only on quite exceptional occasions, such as when the Committee organized an international conference in this country, was anything regarding its doings likely to reach the general public. Latterly, the Committee's work has perhaps been more popularly recognized, particularly as the result of its activities on the occasion of the Coronation of King George, and again in connection with the War. Its issues of 'Fire Warnings' and 'Air Raid Notices' have been so large that these are becoming familiar to the public generally, who must gradually realize that a public body exists for the purpose of inaugurating and carrying out this work.

"It has not been the ambition of the Committee to court public notice. It has taken as its model the policy of some of the best-managed Government Departments, which is to *work unostentatiously for the benefit of the public generally.* It has found that by quiet and steady work useful results are more effectively obtained than by the clamor of public meetings and other ostentatious methods. It has kept entirely free of the slightest political predilection, and has been careful not to avail itself of anything that might be construed as political favor. And perhaps it is well that its work has been so carried out, inasmuch as *all work in the cause of fire prevention must necessarily meet with a certain amount of opposition,* and such opposition, where vested interests are concerned, is occasionally of a very virulent and unscrupulous character.

Some Reasons for the Committee's Success

"That good work has resulted and many improvements have been achieved has been due to certain features that claim mention.

"In the first place *the Government of the day has invariably supported the Committee's endeavors,* and every Government Department has rendered the Committee such assistance to achieve its object in the public interest as was in its power. The innumerable expressions of appreciation received from the Government and its Department speak for themselves, and one instance is here repeated—namely, that of the views of H. M. First Commissioner of Works (the Earl Beauchamp, K. C. M. G.), who, when *speaking on behalf of the Government,* said:

"'* * * His Majesty's Office of Works benefits naturally by the information which has been spread amongst people in this country upon the various methods for the prevention of fire. We have benefited, of course, because we have always been anxious and ready to take advantage of the influence and of the importance of the British Committee which has dealt with this subject. We make continued use of the results of the deliberations of the British Fire Prevention Committee.

"'It is perfectly true, and many of you will probably realize the fact, that the criticism which is generally made of the work of our British Committee is that it is somewhat drastic. On the other hand, I should venture to say that the severe conditions which are imposed by the Committee are really what has caused the reputation—the high reputation—and the efficiency of the Committee, and its influence and usefulness are now so extended and it has spread so that its scope may be said to include all European countries that have Associations which have for their object the prevention of fire and that are represented on the International Council.

"'We have found, certainly in my judgment, that the spread of information and the experience which has been gained from the British Committee is of very great value. The standard in these matters has been raised * * *

"'It is perfectly true that the work of the * * * British Committee is of a voluntary kind. It has no power to enforce its views, but it is a great thing in these days when public attention is directed to so many different objects that there should be * * * a British Committee such as this in which experts are able to focus public opinion and to provide a standard below which it is wrong for any Public Department to fall.'

"In the second place *the Committee has* kept largely to facts and *avoided the expression of opinion* on subjects of a controversial character, whilst the *presentation of facts,* as a rule, *sufficed to show the reason for the Committee's endeavors.* This, combined with the circumstance that the entirely disinterested action of the Committee was apparent to the responsible members of the Government and Civil Service, led to the Committee enjoying the confidence of those in the Government Departments who were primarily concerned.

"In the third place, the press, and especially *the technical journals,* materially *assisted the Committee,* realizing the beneficial trend of its efforts and the absence of anything but reliable data in the matter prepared for its propaganda of fire prevention. The publicity freely accorded by the press to the Committee's notices and warnings has been invaluable.

"Lastly, the *work within the Committee* has been of a *harmonious* character throughout, and this collaboration has led to the closest friendship between many individual workers. The organization of the work allows for decentralization and the allotment of tasks to those specifically conversant with the technical issues involved, and the amount of sustained technical effort and *care given by the Committee's workers engaged upon individual problems has been remarkable;* in fact, the *Committee's reputation for thoroughness* and exactitude has been largely *based on* their generous and *painstaking work, and voluntary service.*

The Scope of the Committee's Activities

"In conclusion, *anyone perusing a list of the publications of the Committee will realize the scope of the work.* These publications—nearly 250 in number—record not only the Committee's general work, but give full details of the numerous tests that have been carried out, besides describing the other activities that have engaged the attention of the Committee. Among these latter may be mentioned the following: The International Fire Prevention Congress, which was opened by the Lord Mayor and attended by some 800 visitors, including the representatives of 15 governments and 200 municipalities and corporations from all parts of the world. The International Fire Exhibition, which was opened by H. R. H. the late Duke of Cambridge and comprised a fine collection of historical and industrial exhibits. The result of enquiries by various Special Commissions who obtained technical information in Continental countries, notably during their visits to France, Russia and Italy. The great conflagrations of the last two decades with the lessons to be learned from them, particularly those of Baltimore, U. S. A., and the city area of the Metropolis. The holocausts of great theatre fires and the charity bazaar fire of Paris. The Committee's work regarding child-life, including the efforts made to obtain and circulate fables suitable for children; its many reports on the technical aspects of fire protection, on special fire hazards, such as those of passenger ships, celluloid storage, etc., its memoranda on the modern treatment of burns, and, finally, its distribution of over half a million 'Fire Warnings' intended to assist the conservation of material wealth by simple means. Latterly, particulars have been given of some of the War emergency work which has engaged the Committee's activities—i. e., its Special Fire Survey Force, its Technical Enquiry Office and its service of Air Raid Notices. But here, again, in the issue of records and other printed matter, as in both the Committee's ordinary routine work and that specially connected with the War, *had it not been for the active assistance of many of the workers and the liberality of certain members of the Committee but little could have been achieved.*

"During the War little can be said of the Committee's work in the direction of endeavoring to minimize all and any fire waste that might affect the country's naval and military operations. At the most it might be indicated that this great national necessity should lead to the Committee receiving every additional encouragement. The support recently accorded by the

Government to a National Scheme of Research has, for instance, already favorably affected the Committee's programme of work, as it has been able to commence a series of investigations it had long contemplated, thanks to the advent of suitable official cooperation.

"Reliable records, painstaking and minute research, the education of the public, and the advance of administrative measures, comprise the four primary divisions of any scheme of fire prevention and the limiting of the slightest outbreak of fire, when it does occur, to the smallest possible area. The past twenty years of the Committee's work have demonstrated that, regardless of the opposition of vested and other interests, considerable progress has been achieved in each one of these important divisions, and that the results have been valuable to the citizen and to the State, both from the humanitarian and the economic point of view."

The Watchman Evil and Its Cure

By W. E. Mallalieu

THE subject of watchmen opens a big field for consideration. The prevailing custom among manufacturers, warehousemen and others is that of engaging as night watchman some superannuated employe who is no longer physically able to earn a workman's pay. Such a watchman may make his occasional rounds of clock stations in a purely mechanical way, but the amount of real protection which he furnishes, especially in war time, is very small. Generally he can be avoided with ridiculous ease by any one who is in the place with hostile intent. Or, if not avoided, his overpowering is a matter of little difficulty.

Some of you know of a recent test in a very large grain elevator, where inspectors were sent into a plant at night time, without the knowledge of the aged watchman. These inspectors spent six hours within the plant and made drawings of many of its important features, but their presence was never once detected. As a consequence the owners were given the alternative of engaging a sufficient number of young and vigorous guards or of having their plant taken over by the state authorities.

900-Foot Pier With One Watchman

The big Baltimore fire of October 30th is a striking example of insufficient watchman service. Here was a pier, 900 feet long, containing such a valuable accumulation of freight as 50,000 bales of wood pulp, 150 carloads of flour, 20 cars of tobacco, 30 cars of bark extract, 40 cars of lubricating oil, 25 cars of spelter, 23 cars of roofing paper, 15 cars of miscellaneous freight in the portion of the pier that was destroyed. Pier 9 contained 29,000 bales of wood pulp, 7,000 cases of imported liquor in the bonded end, 300 crates of earthenware, 100 bales of oakum, 100 cars roofing paper, 50 cars of linseed oil cake, 20 cars of tobacco, 23 cars of miscellaneous freight. Think of leaving these stores in the sole charge of a single watchman in a time such as the present!

There are really few subjects in fire prevention so important as the abrogation of this time-honored custom of inefficient watchmen. To make the safeguarding of our production of supplies depend upon those who can furnish only nominal safety, during the hours when darkness brings the greatest dangers, and to do this in a period of extensive hostile activities would be ludicrous if it were not so grave. It is equivalent to locking the windows and leaving the front door open.

Picked Men, Not Derelicts

Watchmen are charged with extraordinary responsibility. They should be picked men, not derelicts. They should be intelligent, courageous, and physically active. They should be sufficient in number to furnish real protection. They should be armed. They should receive special training for their important duties, and this training should include knowledge of fire alarms, fire prevention and fire protection. They should never be engaged except upon unmistakable evidence of character, and they should be paid the salaries that will command such qualifications.

I wish respectfully to suggest that you gentlemen give early and earnest consideration to the correction of what we may well call "the watchman evil." I wish to raise the point as to whether each one of you may not profitably undertake to secure statistics of the watchmen's service in his own State, and to formulate means for a sweeping reform of the whole absurd system. If this can be done, and I believe that you can do it, the efficiency and safety of the nation will be greatly enhanced. It is a crying need of the present hour.

Efficient watchmen and approved watchman's clocks should find a place in every industrial plant and storehouse.

The Artistic Treatment of Concrete Structures

By Oliver R. Parry

ADDRESSING a recent gathering of the American Concrete Institute upon "The Artistic Treatment of Concrete Structures," Oliver R. Parry, a widely-known architect of Philadelphia, who has given careful study to concrete construction, said in part:

"While much of lasting benefit should result from this well attended and diversified gathering, yet an analysis of these proceedings reveals the fact that only a few gentlemen representing the profession of which the speaker is a member are or have been present during our deliberations. This does not seem exactly as it should be, either for the good of the architectural profession or for the good of concrete as a building material and must suggest to our officers and members that something is lacking to excite a real interest in concrete construction which we, as a body, advocate. Can it be that the lack of a proper exploiting of examples of artistic treatment in our magazines, and insufficient papers upon this subject in our proceedings are partly the cause of such disinterestedness? The speaker thinks this is the case to a great extent.

"Now, gentlemen, we are all perfectly cognizant of the great ability of the officers of this organization; we know what they have accomplished in the past, are accomplishing now and can accomplish in the future, therefore, it seems reasonable to believe that the lack of attendance on the part of the architectural profession rests largely with that profession at large. This is to be regretted, since the foundation source of all work should be the incentive for, and contain instruction to make possible, the very best artistic design and workmanship. The majority of you gentlemen, the speaker presumes, are structuralists and, therefore, naturally look to the architect to give you that which is to be followed in the design and treatment of the work to be executed. Now if the architects do not devote thought and study to concrete construction from the artistic point of view there must be some cause or causes which it would be well to ascertain immediately.

Great Possibilities of the Product

"Can it be a fear of lack of possibilities in concrete as a material susceptible to artistic treatment, or possibly a disinclination to develop the possibilities of this material in general practice outside of the usual commercial building? We can hardly believe it can be the latter, because every new structural material introduced into the building world has been taken up and is being employed, alone or in combination with other materials, to produce artistic results. How much more possible is it to procure the most artistic treatment with concrete? Those present who have worked along art lines in concrete construction, realize the great possibilities of this material in general practice outside like the speaker, anxiously awaiting development along this line which will evidently put concrete in its proper place as a leading material in arts and crafts.

"The speaker does not believe, as a member of the architectural profession, that there is a single material used in the building world as acceptable and adaptable to artistic treatment as this same concrete, not alone perhaps as plain commercial concrete but in combination with cement, white or yellow sand, and colored aggregate susceptible to treatment with the bush hammer, etc., as well as in combination with other materials such as brick, stone, tile, etc., and in treatment with various color and tone cement coatings now so generally procurable in the open market. In fact, there is no end to the variety of treatment one can obtain with intelligent study and ingenuity; and in addition to reproducing every kind of 'art stone' from Indiana limestone to granite, it is also possible to procure hardwood effects, which, when treated as a finished article, so closely imitate oak, chestnut, etc., that the only way to tell the difference is through the touch.

Need for Greater Publicity

"Now, gentlemen, it would appear to the speaker as though we should devote more time and attention to the artistic features of concrete work, and that a much greater proportion of the papers read before the Institute should be on this subject and our technical publications contain in every issue numerous examples of executed artistic concrete work.

"In addition it can not be too strongly advocated that a yearly publication be issued by the American Concrete Institute along the lines of the 'Architectural Record' or some similar publication, with illustrations of the better and more artistic class of buildings erected in concrete during the preceding year. The distribution of this book should be to the architects' offices throughout the country either by subscription or, if need be, in some cases, complimentary. Every designer, every man who creates the beautiful, should have a copy of it; and the speaker believes if the work that has been done is shown, the possibilities of concrete will be so generally recognized that from year to year the increase in extent of use and beauty of designs will continue until the less permanent building materials give place to concrete.

"From the Institute's point of view, the more art it develops in concrete construction the greater the opportunity for increased membership from the architectural and building fields, which the speaker thinks would not be a disadvantage. The speaker urges that our president and each member of the Institute seriously consider this, and that it be taken up by the Board and word be sent broadcast throughout the entire country that we stand for artistic treatment in all structural work where concrete is a component material and that this is one of the most advantageous features in the selection of concrete as a building material.

"Let us see that the architects become interested in concrete. It is absurd to expect the majority of you gentlemen who are busy with large problems along commercial lines and in other directions, to devote your time and thought to suggesting what can be done in the way of texture and color treatment for the architects' instruction. It seems absurd, because the architect should design and originate. He knows what best follows out his own creation and how to secure his effects, and if he asks the 'Structuralist' to do this for him then he is negligent and not fulfilling his entire duty.

"In closing the speaker wants to thank you for this opportunity to say what has been long in his mind; and while it might have lain dormant a little longer, this is perhaps as opportune a time as any for an expression which may stir our exhibitors at the cement show to do even better next year. He does trust that much greater importance will be attached to the treatment of concrete structures and work, that an educational campaign will be pushed through the country in this connection and that we will enroll more members of his profession in the American Concrete Institute."

Bungalow Group Housing For Wage Earners

By W. L. Shafer

W. L. SHAFER, manager of the Lebanon (Pa.) Chamber of Commerce, contributed to "The American City" an interesting account of an industrial home building experiment recently undertaken by public spirited citizens of the community.

"Thirty-six homes" Mr. Shafer says, "in the housing plans formulated by the Lebanon Chamber of Commerce are now under construction at Lebanon as the first unit of a total of sixty-two houses which will be built in the first plot of this development. The work is the result of several months of study on the part of the Lebanon Chamber's housing committee. The Lebanon Chamber's committee asked for competitive plans from its member architects and others for group instead of the old-time row types of houses. The plans and plot layouts submitted by the Stetler-Mengel Company, of Reading and Wyomissing, Pa., were selected. While not so elaborate as the groups at either Forest Hills or Marcus Hook, they present a cosy, homelike appearance, being of the group bungalow type.

"A majority of the house groups will contain either four or six homes, and there will be one group of eight homes and two groups of two homes each in the first unit of construction. Between the groups in a city block will be a light, air and lawn space of about ten or twelve feet. At the street and alley sides there will also be a lawn strip, instead of having the house wall abut on the lot line. The groups will be set back at least fifteen feet from the front lot line. The contract calls for the landscaping and tree planting of the lots and parking strips, and for concrete walks in front and gravel or cinder walks in the rear.

"The individual houses will be approximately alike in interior design. Each is to contain six rooms, a cellar under the entire house, an individual hot-air furnace, bath and complete plumbing, electric light including fixtures, gas in the kitchen, and front and rear porches. The construction will be of brick on a limestone foundation, and a solid brick wall will separate each house from its neighbor. The wall facing will be of pressed brick, select brick or stucco. It is thought that with this variety of exterior finish, the varied architectural designs, and the landscaping and group settings decided upon, an attractive suburban district will be created.

"The houses in this unit, completely papered and with the improvements described, have been selling at prices ranging from $2,875 for the inside homes to $3,150 for the end houses at the street corners. Arrangements have been made with the Myerstown Trust Company for financing the first mortgages on the houses. That company will also serve as the trustee for the entire operation. Plans are being worked out for financing the second mortgages for the purchasers so that the average wage-earner may own his own home without incurring any greater financial burden than if he were paying rent.

"The Stetler-Mengel Company, designer of the plans, is acting as general contractor and superintendent for the operation."

Natural Lighting and Factory Efficency

By R. W. Johnson

IT is a well-established physiological and psychological fact that gloomy surroundings have a depressing mental effect and reduce the physical efficiency of human beings. The natural consequence is reduced productive efficiency, and, therefore, loss to the employer. This reduced efficiency is quite aside from the losses arising directly from the same lack of sufficient light, through imperfect workmanship and wasted material, and the reduced *morale* of a working force so situated.

It is then highly important that the most careful attention be given to the lighting of a factory or shop. The cheapest, and by far the best light is natural sunlight, tempered or diffused uniformly throughout the plant. There should be a sky exposure sufficient to insure ample light for all interiors, and a relatively large window area, such as to permit the proper utilization of the light.

The windows should reach from ceiling to within three or four feet of the floor, the distance naturally depending upon working conditions. In warehouses or other store-rooms consideration of course must be given to the stacking of material against the walls.

Style and Form of Sash

Not only is the size of the window openings to be considered, but also the style and form of the sash. If the customary types are used, whether of wood or of pressed steel, it is necessary to make the openings considerably larger than if wrought steel sash are employed. The latter permit an influx of something like 20 per cent. more light, and in several other respects also are very desirable. Their proved fire resistance qualities, for one thing, and the simplicity with which ventilation may be secured, especially commend this form of sash. There is no sticking, as in the case of wooden sliding sash or even of pressed metal or metal-covered sash when reasonably close.

Pivoted sash, whether the swing be horizontal or vertical, are preferable to the sliding. They are mechanically simpler and therefore less expensive, and have the advantage of being easily operated, either individually or collectively by mechanical devices installed for the purpose. A whole length of a room may have all or a given part of its pivoted sash swung by the turn of a wheel.

Glazing and Care of Windows

The glazing and care of windows do not usually receive the attention they deserve. No matter how much window space there may be, unless some method is employed for diffusing the light in rooms of any considerable depth, the illumination will be uneven. The spaces farthest from the window openings will be in comparative obscurity, while near the windows the light may be quite blinding. Where shops are wide enough to avoid the ill effects of the cross lighting, and in all cases where care is taken to prevent it, both side walls should by all means be provided with windows. In any case, provision should be made for an even diffusion of the light. Where direct undiffused light enters from more than one direction, the cavernous depths of the shops are penetrated by interfering walls of light. The effect of such cross lighting is disagreeable.

The prejudice against cross lighting, that is, the interference of light entering a room from different directions, is justified only where diffusion does not take place. Intense lights from different directions make it more difficult to avoid their blinding effects upon the eye, and they introduce distorted shadows, unnatural effects, and unnecessary eye fatigue. With the light diffused, the effect is like that of a daylight when the sun is behind thin clouds.

Kind of Glass to be Used

There is much difference in the diffusing effect of the various forms of glass intended for this purpose. Any glass with a roughened surface will give some diffusion, which is nothing but the dispersion of light rays in all or in determined directions instead of permitting them to pass directly on as they would when coming through smooth and transparent glass.

But only a glass, one of whose surfaces is virtually a series of parallel prisms so arranged as to direct a large proportion of the rays in planes nearly parallel with the floor and ceiling can equalize the illumination of parts near to and those remote from the source of illumination. Ground glass intercepts so much light that it is undesirable. Ribbed glass set with the ribs horizontal accomplishes the purpose very well, and prism glass does it better. Where the rooms are very wide the latter is most likely to be satisfactory.

Maze glass, by which is meant any translucent glass with a figured surface, breaks up light rays and disperses them more effectively than any other kind; but as the diffusion is in all directions, the penetration is diminished, and it is not possible to get light from windows so glazed far into deep rooms. Its best use is for windows in comparatively narrow buildings, and to get from windows more or less exposed to the sun, an effect resembling the much desired north-light.

Windows Translucent

Windows wholly glazed with translucent sheets are not, however, entirely satisfactory. Workmen usually like to be located near windows. Some bosses object to such an arrangement on the ground that much time is lost in looking out, especially by women workers. The well-informed foreman knows that the desire to look out of the window is not only legitimate on the part of the workman, but is a positive help to efficiency. The operator's eyes, if constantly fixed upon nothing but the work before him, or upon nearby objects in the shop, grow wearied and strained. A momentary glance at something distant relieves the strain, relaxes the tension and permits the eye to work on refreshed, as it were. That is the basis, though not always consciously, for much that employers have done recently in making the external environs of their factories, as well as the internal, more presentable to the eye. The advantage of an open site, as compared with a crowded city location, is apparent in this connection.

The various forms of prismatic, maze, and other translucent glass, prevent this relief to the eyes of workmen; and it is, therefore, advisable, in order to satisfy all the conditions, to use these, or some of them, in connection with plain glass.

Undoubtedly the best lighting obtainable for workrooms is that from a properly designed and constructed saw-tooth roof. It is, of course, peculiarly adapted to the low one-story building, but is at times used for the upper story of multi-story structures.

In order to get the best advantage of good lighting, it is desirable that the interiors of buildings be painted white or, better, a greenish gray. This serves the double purpose of aiding the dispersion of light, and of indicating the relative slovenliness or cleanliness of the place. Machines should likewise be painted in the same manner instead of the customary funeral black.

Natural Light the Best

Natural light is by all means the best known illuminant. The best artificial light gives but a small fraction of the illumination given by sunlight, whether direct or indirect. I have already pointed out the influence of poor light upon the efficiency of workmen. The skimping of windows in factory construction is the worst thing that could happen to the development of the factory spirit—co-operation and fellowship. Natural light is also cheaper than artificial and it is indeed absurd to pay for an inferior quality of what can be had in unlimited quantities for nothing. I have nothing against artificial lighting, do not misunderstand me. Adequate provision is essential. The dark days of winter and night work all need to be considered in planning light for any industrial establishment.

Safeguarding Cotton Against Fire

ASSERTING that "the safety of the world is dependent upon American cotton," the National Board of Fire Underwriters has issued a special bulletin to all shippers and handlers of the product, advising in detail how it may be safeguarded against fire, both accidental and incendiary.

The suggestions relate to cotton in gins, compresses, sheds and warehouses and at terminals.

Of primary importance is to see that the premises housing the products are kept clean; smoking strictly prohibited, and only men known to be thoroughly trustworthy employed in its care.

In ginning "all of the lint flues, battery condensers and dust flues must be of metal." Chemical extinguishers as well as water pails, should constantly be on hand, and these should be supplemented by steam jets and an adequate supply of hose properly connected and available for instant use.

Protecting Roof Openings

"All openings in roofs, whether they be sky-lights monitors, saw-tooth risers and ends of ventilators, must be protected with galvanized wire screens, or otherwise protected to prevent the entrance of sparks."

Death of a Leading Philadelphian

JOSIAH A. McKEE, vice-president and treasurer of Merchant and Evans Company, died at his home in Philadelphia, December 18th, after a brief illness, aged 73 years. He was born in Columbus, Ga., but moved at an early age to Philadelphia, where he was long identified with the banking business, having been cashier of the Tradesmens National Bank for many years prior to becoming treasurer of Merchant and Evans Company in 1896.

Mr. McKee was well known to the metal trade throughout the United States, and was foremost in every movement having for its object the betterment of trade conditions and the creating of a higher standard of business methods. For several years he was chairman of the Metal Branch of the National Hardware Association of the United States, and was also at one time president of the Philadelphia branch of the National Association of Credit Men. At the time of his death Mr. McKee was also secretary and treasurer of the Globe Automatic Sprinkler Company; vice-president and treasurer of the Schuylkill Railway Company, and a director of the Peoples National Fire Insurance Company.

He served in the highest sense both the public and private good of all with whom he came in contact. His death is deeply regretted and his memory will long be cherished. Mrs. McKee survives him with two sons and a daughter.

A Department Devoted to the Use of
AUTOMATIC SPRINKLERS

Edited
IRA G. HOAGLAND, Secretary **PAUL MASON, Special Representative**
National Automatic Sprinkler Association

Coal Shortage Reveals Reliance on Sprinkler Protection

APPREHENSIVE of "a conflagration of the first magnitude in the city of the world which has the greatest concentration of values" (the words of a prominent underwriter), the losses from which would be stupendous enough to wreck all the fire insurance companies, shatter national credit, upset the money market, impair security values, waterlog flotation of future Liberty Loans and in general impair the economic integrity of the nation at a time when such a shock would be well-nigh apoplectic, because hundreds of the sprinklered buildings forming a conflagration barrier in the heart of New York have been short of coal, and unable to maintain enough heat to keep water from freezing and crippling the automatic sprinkler systems, representative New York fire underwriters met with city officials and prominent citizens to consider the best course to pursue to obtain security from the portentous peril.

Situation Unparalleled

"This special meeting has been called that we might in conference give consideration to a situation unparalleled, I think, in the history of fire underwriting in New York," said the chairman, James Marshall. "For many years, as you know, underwriters in earnest and hearty co-operation with the city departments and city government have used every possible influence to bring about the installation of that most modern of internal protective devices, the automatic sprinkler."

The results of this influence, Mr. Marshall said are some 2,400 sprinkler equipments in New York, and that because of the unprecedented weather conditions and shortage of coal "over 60 per cent. of the equipments are out of business."

"Underwriters predicate their acceptances upon sprinklered business with a freedom not marking their treatment of any other risks," continued the chairman. And because of the load of liability the insurance companies are carrying on sprinklered risks and the magnitude of their obligations, he said the underwriters desired this counsel with city officials and officers of the Chamber of Commerce, the merchants' and credit men's and other civic associations.

"This is not a situation where underwriters concern themselves with the acquirement of an additional premium—of an additional rate," concluded the chairman. "No additional premium can be substituted for the protection that is withdrawn by the impairment of these sprinkler equipments. What we seek is a method of bringing about the immediate reinstatement of this mechanical protection."

Sprinklers Modernized Metropolis

"Modern conditions have brought about buildings of immense areas, crowded with a value which in the time of our grandfathers would have been value enough almost for a whole city," said Frank Lock, a prominent underwriter. "These conditions, I think we may say, are largely made possible by the automatic sprinkler. With all due deference to the powers of the fire department—and the power and efficiency of that department are magnificent—we still have to come back to it that modern conditions in a city like New York would hardly be possible apart from the sprinkler equipment."

Mr. Lock said that a fire developing in a building which had attained unusual proportions because of sprinkler protection, and temporarily without this protection, might eventuate into "a conflagration of the first magnitude in the city of the world which has the greatest concentration of values—and the value of the sprinkler equipment in the prevention of a conflagration is impossible to overestimate."

Stupendous Catastrophe Potential

"It is obvious," Mr. Lock declared, "that if we have—which we can have—a conflagration loss in New York City amounting to $500,000,000, that amount of loss which we should have to provide promptly, surely and not in promises, but in actual cold cash, would exhaust our treasuries. And if we have that conflagration and we should be called upon for a sum of three or four or five hundred millions of dollars, where are we to get the replacement of that fund? Can we go into the open market today and borrow the money from our banks upon depreciating securities?

"The very occurrence of such a conflagration would increase depreciation of our securities, and we have nothing in our hands which could appeal to the investing public at the present time to come back and fill our depleted treasuries in the event of our meeting with such a catastrophe. The whole basis of credit will be shattered should the companies be brought to the point that they are not prepared to give the blanket of indemnity to the rest of the country if their resources should be sucked dry right here."

In remarking the unprecedented emergency Mr. Lock said war conditions are not wholly responsible. "We have never had these conditions in our lifetime and never shall again." War conditions, the fuel famine and "unparalleled climatic severity," Mr. Lock said are a combination of "circumstances meeting at the same time which have put upon this city an emergency which is full of menace."

Security, Not Money, the Urgent Need

"It is not money we are after, it is security we are after," Mr. Lock asserted. "When it became known that these risks, where we are carrying ten times the liability and at rates one-tenth of what they would be in the absence of sprinklers, were without sprinkler protection, the first suggestion was: 'Put on additional rates—penalize.'" He said that this seemed like persecution as "the conditions that have brought this about are not the fault of the sufferers."

"It was a wise thought" that there should be a conference of "those who are most deeply interested in the protection of the city," remarked Mr. Lock. "We must not fool ourselves that we are through with the winter. Remember the saying, 'As the day lengthens the cold strengthens.' We have another seven weeks where ordinarily intense climatic conditions may be expected. Snow means congested streets, congested fire hydrants, difficulty in hauling fuel and the like. We have to face these things and we want counsel—we want to meet and hear from those who are our clients and whom we are supposed to buttress against financial loss with our indemnity."

Special Committee to Seek Relief

Mr. Lock moved for the appointment of a special committee of five underwriters to, among other things, confer with municipal authorities, including the fire department, looking to all possible means of relief and especially to bring pressure upon the proper authorities to supply fuel to the crippled plants; also to confer with property owners, their insurance brokers and with representative organizations such as the Chamber of Commerce, the merchants' and credit men's associations, the real estate boards and the like as to all available measures of relief and influence.

"Our wish is to strengthen the hands of the fire department," Mr. Lock concluded. He bespoke the reliance and support of the representative elements of the city's life in bringing to light recalcitrant or inattentive property owners so that the underwriters may know who are the "slackers and bring the proper pressure to bear in every possible way." This committee, said Mr. Lock, would put the underwriters "in a position of close co-operation with the city authorities to bring about an amelioration of this tremendous menace."

Fire Chief Kenlon Fears Conflagration

"I have always said that I did not fear under ordinary conditions a conflagration in New York City, and I say it again," declared John Kenlon, chief of the fire department, "but if the streets were piled full of snow and we could not move apparatus rapidly, and sprinkler equipments were frozen to the extent that they have been, then I would withdraw that assertion and say that the probability of a conflagration does exist."

Chief Kenlon said that he had set to work to get some protection from sprinkler equipments where the automatic feature is not available. He explained that the systems drained to prevent freezing could be supplied with water by the fire department through the fire department connections of the systems.

Sprinklered Conflagration Barrier Down

Willis O. Robb, manager of the New York Fire Insurance Exchange, exhibited a map showing the sprinklered risks in Manhattan. Two groups of them in the heart of the great city comprise, when their sprinkler equipments are in full operation, the chief and only reliable barrier to the spread of a great conflagration across Manhattan Island. Mr. Robb said that 60 per cent. of that barrier was down. Because of this condition and in view of the public welfare not merely of New York but of the whole country, Mr. Robb said the need of coal in New York is very much more serious than anywhere else.

Coal Allowed for Sprinklered Buildings

Consternation was added to the confusion of the sprinklered protection demoralization when Federal Fuel Administrator Garfield ordered a restraint of the use of coal for power and heating in manufacturing plants during certain periods. Manager Robb of the Fire Insurance Exchange protested that unless sufficient heat was allowed in sprinklered plants the automatic sprinkler protection would have to be shut off and drained to prevent damage by freezing. He asked for relief under the provision of the Fuel Administrator's order authorizing exemptions "to prevent injury to health or destruction of or injury to property by fire or freezing."

As a result of this protest, State Fuel Administrator Wiggin authorized the N. Y. Fire Insurance Exchange to issue this notice:

"To Those Responsible for the Maintenance of Automatic Sprinkler Equipments Throughout the City of New York:—

"State Fuel Administrator Wiggin has issued a general order with permission to this Exchange to promulgate same to all parties interested, allowing the use of fuel for heating risks protected by automatic sprinklers to such a degree as may be necessary to prevent freezing."

Crippled Protection Rapidly Restored

As bad as conditions were, they would have been much worse without the admirable supervision of the New York Fire Insurance Exchange's sprinklered risk department under Superintendent E. P. Boone, and the competent emergency service facilities of the companies specializing in sprinkler system installation. What an officer of one of the companies said about the service rendered by his company is typical:

"We were fully alive to the situation and appreciated what it meant to have a large number of sprinkler equipments inoperative. We immediately organized our forces to meet the conditions properly and restore the systems as speedily as possible. We called in all practical workmen on our payroll working on uncompleted installations and started all of our inspectors and engineers responding to trouble calls. They immediately ascertained the extent of troubles, the probable amount of materials necessary for repairs and reported this information by telephone. Our construction department was told what was necessary in the way of tools and materials and the kind of work necessary to do, so little time was lost in getting work under way to put the sprinkler systems back in proper condition.

"There being a possibility of shortage of special fittings, valves and other apparatus that might be needed, we arranged with our traffic department for transportation facilities for these materials from our plant which is some distance from New York. Freight and express embargoes made the usual rail route out of the question so arrangements were made for motor truck transportation.

"All of our men displayed most admirable zeal and worked night and day in order to restore the impaired systems to operative condition as speedily as possible. In a number of cases men worked all night on the roofs of buildings when the thermometer was below zero. There being a serious shortage in the skilled labor market, our superintendents employed everyone capable of intelligently aiding our work and every man skilled or unskilled."

Protecting Fire Fighting Appliances

SOME seasonable suggestions to protect fire fighting appliances against freezing are offered by the Globe Automatic Sprinkler Company as follows:

"Unless extreme vigilance is exercised the very best installation of fire appliances may suffer temporary disablement from frost. Automatic sprinkler systems, hydrants, and all appliances using water for fire extinguishment naturally require special care and attention in winter. The following precautions should be taken; inspections being thorough, with nothing taken for granted.

"1 Examine tanks and all pipes, fittings, and valves, whether for steam heating, general water service, or fire protection. SEE THAT NONE ARE FROZEN OR SPLIT, and that they are ALL IN OPERATIVE CONDITION, and where there is any liability of freezing, arrange for the necessary protection.

"2 Examine carefully and provide suitable boxing around any pipe lines which may be in an exposed location (either between ground and first floor, between buildings, or near windows, doors, etc.) Make frequent tests of these during the winter to make sure the piping is not frozen.

"3 MAKE A CAREFUL EXAMINATION OF ALL PIPING IN DRY PIPE SYSTEMS, TO DETERMINE IF ALL THE LINES ARE PITCHED TO DRAIN PROPERLY, AND IF ANY 'TRAPS' ARE FOUND, MAKE THE NECESSARY REPAIRS.

"4 SEE THAT ALL VALVES ARE OPEN THAT SHOULD BE OPEN, and try water outlets to ascertain if all pipes are free and ready for service.

"5 See that EXTRA SPRINKLERS are on hand for emergency use.

"6 Be sure that your engineer is fully posted as to the purpose and intention of every valve and pipe.

"7 Try your pumps and make sure they are in proper working order.

"8 Test all HYDRANTS and INDICATOR POSTS for proper drainage.

"9 INSTRUCT THE NIGHT WATCHMAN thoroughly in the use of all fire apparatus and the operation of all valves.

"10 Examine the end of pump suction pipe to see that strainer is clear of refuse. In many cases the capacity of pumps has been greatly reduced by obstructions.

"11 We call your attention to the liability of freezing of water in casks and pails in cold buildings, and suggest that you take measures of prevention, at the same time avoiding danger of water damage.

"12 Chemical extinguishers should be emptied and recharged yearly."

SAFE HOMES

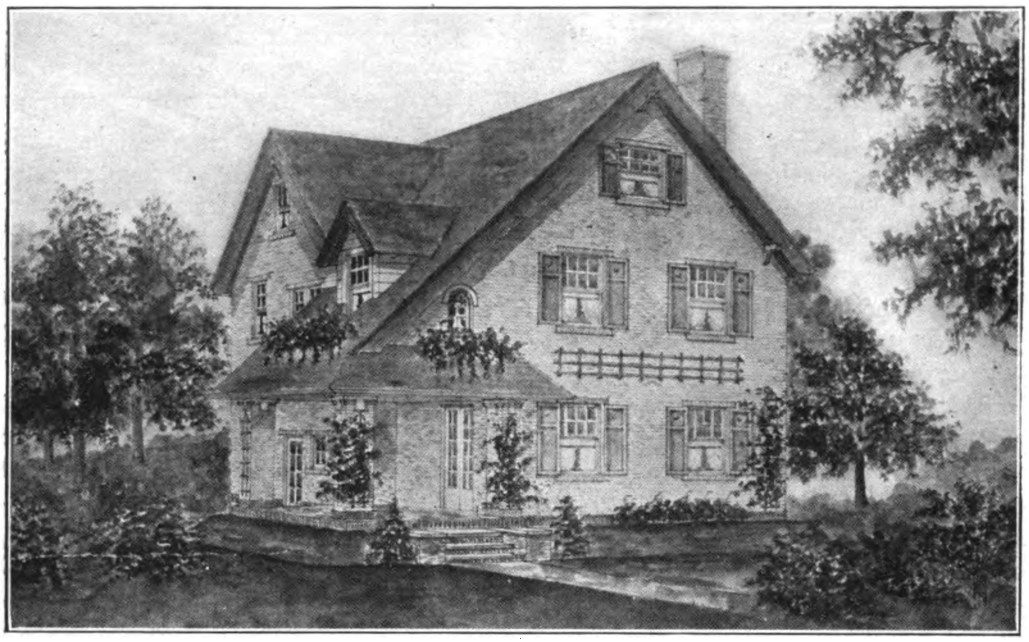
Edited by RALPH P. STODDARD, Secretary
Society Advocating Fire Elimination

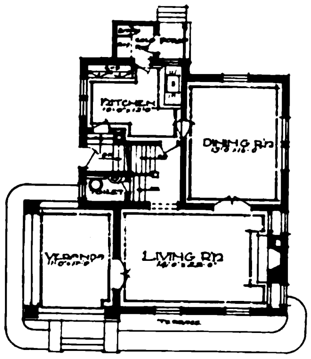
English Type of Home

WITH the demand for houses of better design—instead of the stock affair, which for years has lined our streets—the cottage type has grown in popularity. This is the distinctly English idea of a home; and the "tight little island" is recognized as the habitat of "homes."

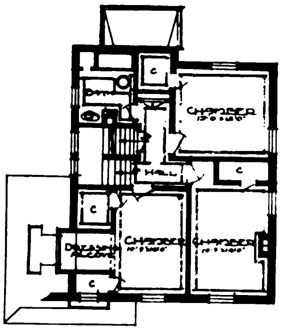
The cottage illustrated is the work of a Cleveland architect, J. M. Bostick, 701 Park Bldg., who has made a study of safe homes and the economical use of fire-resistive materials in their construction. It is a strictly high-grade home for a man of moderate circumstances and is in no sense a "workingman's" cottage. While it has but six rooms, all are large and a full-height attic is provided in the third story.

Study of the plans will show a particularly livable residence. The porch is upon the side, where it will not darken the front windows of the living-room. The dining room is good size and its walls are unbroken, allowing wide latitude for the disposal of furniture. The combination stairway with the lavatory tucked out of sight under it, is a valuable feature, seldom found in small houses.





· FIRST FLOOR PLAN ·
27·6 x 32·0



· SECOND FLOOR PLAN ·

The chambers are of good size and all lighted and ventilated from two sides. Closets are particularly large. The front room over the porch, with its two closets and dressing-alcove, is an up-to-the-minute feature.

Range of cost of this house is rather wide. The walls might be of brick, with slate roof, or of hollow tile faced with stucco, with tile roof of harmonious tint. The finish of the interior, also, gives opportunity for considerable variation in cost of the finished house.

Of average construction, either brick or stucco, in a city where labor and materials were at about average prices, it should be built complete and ready to move into for not to exceed $7,500.

Defeat!

THAT is what the 1917 building record spells for the industry. But it is not a crushing and inglorious defeat—rather one indicating the inevitable readjustment to war conditions.

But it is a defeat, nevertheless, and one which the industry feels keenly; this because of the exceptional efforts put forth by those involved—particularly the manufacturers and dealers in building materials—to make this year better than 1916.

There were times when it looked as though they were to succeed, in spite of the combination of circumstances arrayed against them—high wages, higher material prices resulting from increased labor and transportation costs as well as of higher raw materials,—the Liberty bond sales, which took millions from the smaller purses that would have gone into new construction. Some months even showed large margins over those of the previous year.

But the aggregate shows a disappointing shrinkage. Actual figures are, of course, impossible to obtain; but those of fifty representative cities scattered about the country show a net loss of thirty per cent.

In many individual cases, Greater New York for example, the gross valuation of new construction in 1917 was less than half that of a year ago. Chicago, likewise, showed a fifty per cent. shrinkage. Boston almost maintained its level of the year previous. Philadelphia showed a loss of almost one-third.

Middle Western cities, as a rule, showed better than those on either coast, Cleveland, Cincinnati, Pittsburgh and Indianapolis ending the year but little behind 1916. Thus this district again maintained its status as being last affected by general conditions prevailing throughout the country. In building as in industrial activity, it is slower to yield to panic conditions and, due to its diversified industries, is somewhat less likely to "boom" when periods of easy money and expansion set in.

Discrepancy of about five per cent. in the decrease in number of permits as compared with valuations, discloses the fact the average cost of buildings was less than in 1916. There was a noticeable lack everywhere of hotel, office building and expensive apartment construction. On the other hand, factory building was greatly on the increase. This less expensive type of construction accounted undoubtedly for a considerable of the smaller average cost.

The past year was one of extensive building, also, of lower priced homes. The great demand for labor in cities and smaller industrial centers, found them unprepared for the influx their factories attracted. The result was a great demand for so-called "workingmen's" homes. In such instances the number of buildings was swelled without a proportionate increase in valuation.

As to the prospects for this year, the building fraternity is divided. With the country just attaining its stride in production of war materials, some are optimistic. Others, having in mind the prospective higher labor and material costs, are prepared for a further curtailment in new construction.

Record of Successful Accomplishment

THURSDAY, January 17, marked the second anniversary of the Supply Dealers Board of the Society Advocating Fire Elimination, composed of Cleveland builders, supply and material dealers.

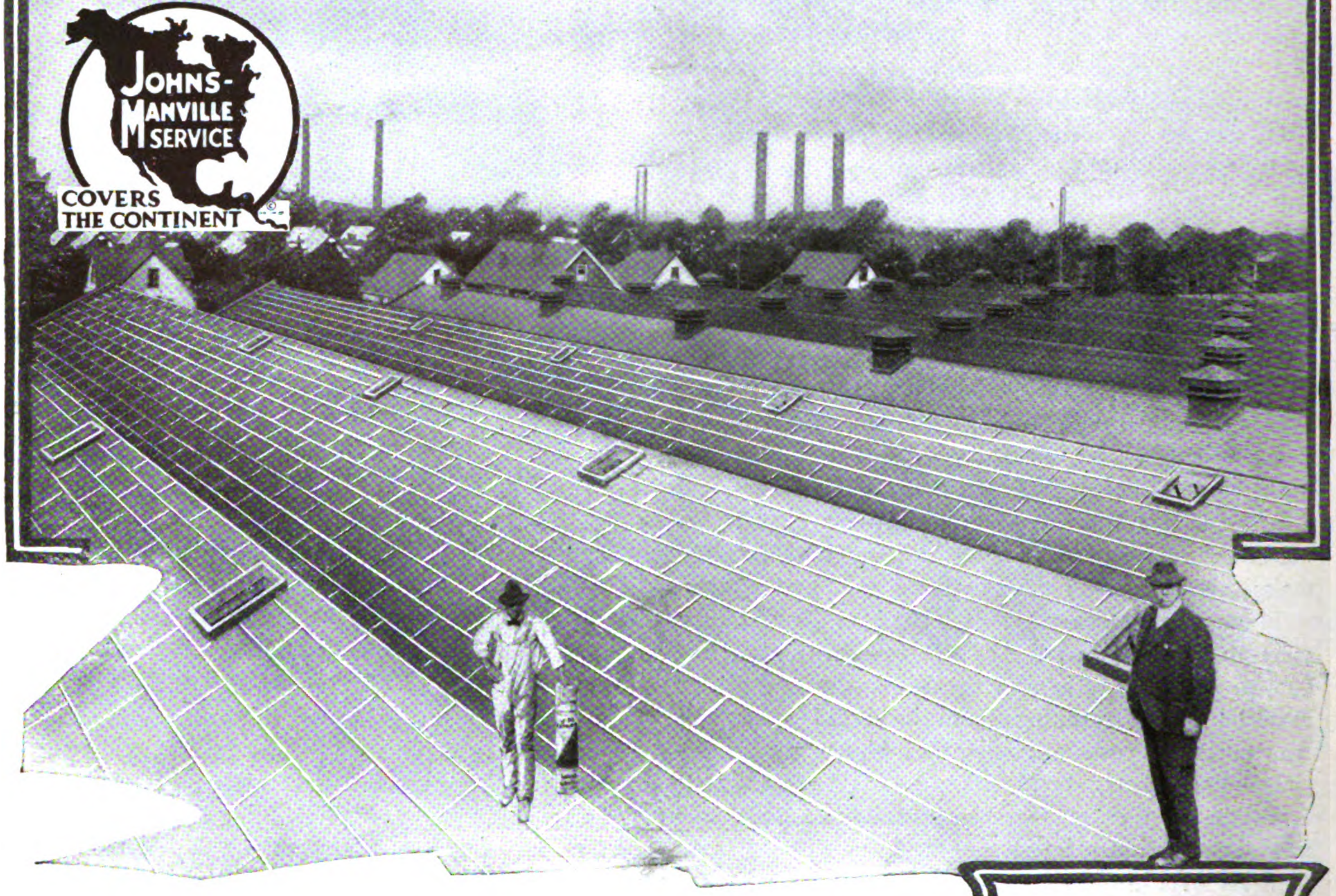
The entire membership of thirty-five gathered at the new Hotel Winton for the annual banquet, to hear reports for the year and to vote for a new board of directors of the body for the ensuing twelve months.

A recast of accomplishments for the year of 1916 disclosed 1916 to have been a particularly successful one. The board's membership was enlarged to a point where now virtually the entire trade of Cleveland is represented in the body. Summary of improved conditions in the trade effected through the efforts of the organization, despite adverse conditions, was a testimonial of what may be accomplished by concerted effort intelligently directed and consistently applied.

Plans for the current year, outlined at the meeting, call for greatly enlarged activities. A comprehensive plan for the extension of its field work, thus broadening the scope of its efforts, is one phase of its program.

The board of directors for the coming year is substantially that of last, the following being chosen: John Truby, chairman, Cleveland Material Company; A. A. Kemper, Sheets Elevator Company; H. Schmidt, Gates Elevator Company; B. R. Taylor, Goff-Kirby Company; Ralph Jones, Lake Erie Lumber & Supply Company; H. W. Caton, U. S. Gypsum Company; Earl Ross, treasurer, Cuyahoga Builders Supply Company; C. E. Griese, Euclid Builders Supply Company; Herbert Geist, Geist Building Material Company, and R. P. Stoddard, executive secretary.

JOHNS-MANVILLE ASBESTOS ROOFING



THE all mineral roof—made of asbestos rock—caps the permanent building. Flexible felts or artistic shingles—both are Johns-Manville Asbestos Roofings.

They are fire-repellent, protecting your customers' property against roof-communicated fires and providing against the day when public opinion will force legislation demanding a fire-retardant roof on all buildings. They are waterproof, practically immune from the attacks of time and need no periodic painting or coating.

Johns-Manville Roofing Responsibility

protects the user of this roofing through an exclusive system of registration. When you register your roofing, it is our obligation to see that it gives service as promised.

H. W. JOHNS-MANVILLE CO.
NEW YORK CITY
10 Factories—Branches in 56 Large Cities

Dealers find the Johns-Manville line a good one to tie up with, because it's easy to sell and profitable to handle.

Easy to sell, because the selling helps we furnish to our dealers are the kind that bring results. Profitable, because you make two profits—one on the sale and one on the laying.

Details of our attractive dealer plan sent on request to interested builders.

WEATHER:
Always warm in winter and cool in summer if you are in a firesafe home, office or factory building.

The Fireproofing News

CONTAINING DETAILED DESCRIPTIONS OF NEW DEVICES AND APPLICATIONS OF MATERIALS WHICH ARE OF REAL VALUE IN FIRESAFE BUILDING: ALSO NOTES ON THE LATEST BOOKLETS, CATALOGS AND OTHER FIRESAFE LITERATURE, WITH OTHER ITEMS OF INTEREST TO THE FIREPROOFING FRATERNITY

LATEST EDITION

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New York City, N. Y., December, 1917

Priceless

FIRST MONOLITHIC CONCRETE BUILDING IN FLORIDA

Through the courtesy of the Sandusky Cement Company of Cleveland, we are able to present herewith a view of the first monolithic concrete building erected in Florida.

The structure, located in St. Petersburg and owned and occupied by the Central National Bank of that city, was built over six years ago, and is still without a flaw in the masonry material. Designed by Willis R. Biggers, the building is of Spanish style of architecture, and cost $70,000.

"It is of four inch concrete slabs, pilaster and beam construction, all poured at one time, and all exterior projections, such as brackets and platforms, are one cast. Two vaults, 12 feet by 24 feet, are of 12 inch concrete and were cast with the walls. The building is 50 feet by 100 feet, four stories in the rear, with a mezzanine floor extending into the banking room."

The Central National Bank Building, St. Petersburg, Florida

The Certain-Teed Products Company will erect a substantial addition to its plant at Richmond, Cal., for the more effective manufacture of its product upon the Pacific Coast.

J. H. Sparklin is the prime mover in organizing the Ocala Lime & Manufacturing Company, of Ocala, Fla., the capital of which has been placed at $150,000.

Cement to Join Metal and Marble

A cement for making metal and marble adhere consists of 30 parts of plaster of paris, 10 parts iron filings and half a part of sal ammoniac and acetic acid added to make a thin paste, which must be used immediately.

Coal shortage and transportation congestion has delayed seriously the delivery of 1,000,000 feet of tile ordered for the new subway stations in New York City.

Heath Unit Tile

Among other advantages claimed for the Heath Unit Tile recently placed upon the market by the Los Angeles Pressed Brick Company, of Los Angeles, Cal., and already in high favor for wall construction are the following:

"A load-bearing wall.

"A wall equally strong in all its parts.

"Alignment of vertical webs.

"Every course is bonded.

"Ready and easy to lay in any and every form of construction.

"Adapted to any thickness of walls

"Wall finishes level on each course.

"Every tile so laid and bedded as to develop its full strength.

"Less cost to lay in wall.

"Requires less mortar.

"Makes lightest wall.

"Can plaster inside and outside without furring.

"Easy and simple to handle around building.

"Choice of two faces on each tile.

"Corners and jambs are as strong as any other part of wall.

"Lintels built with standard block.

"No cutting on job.

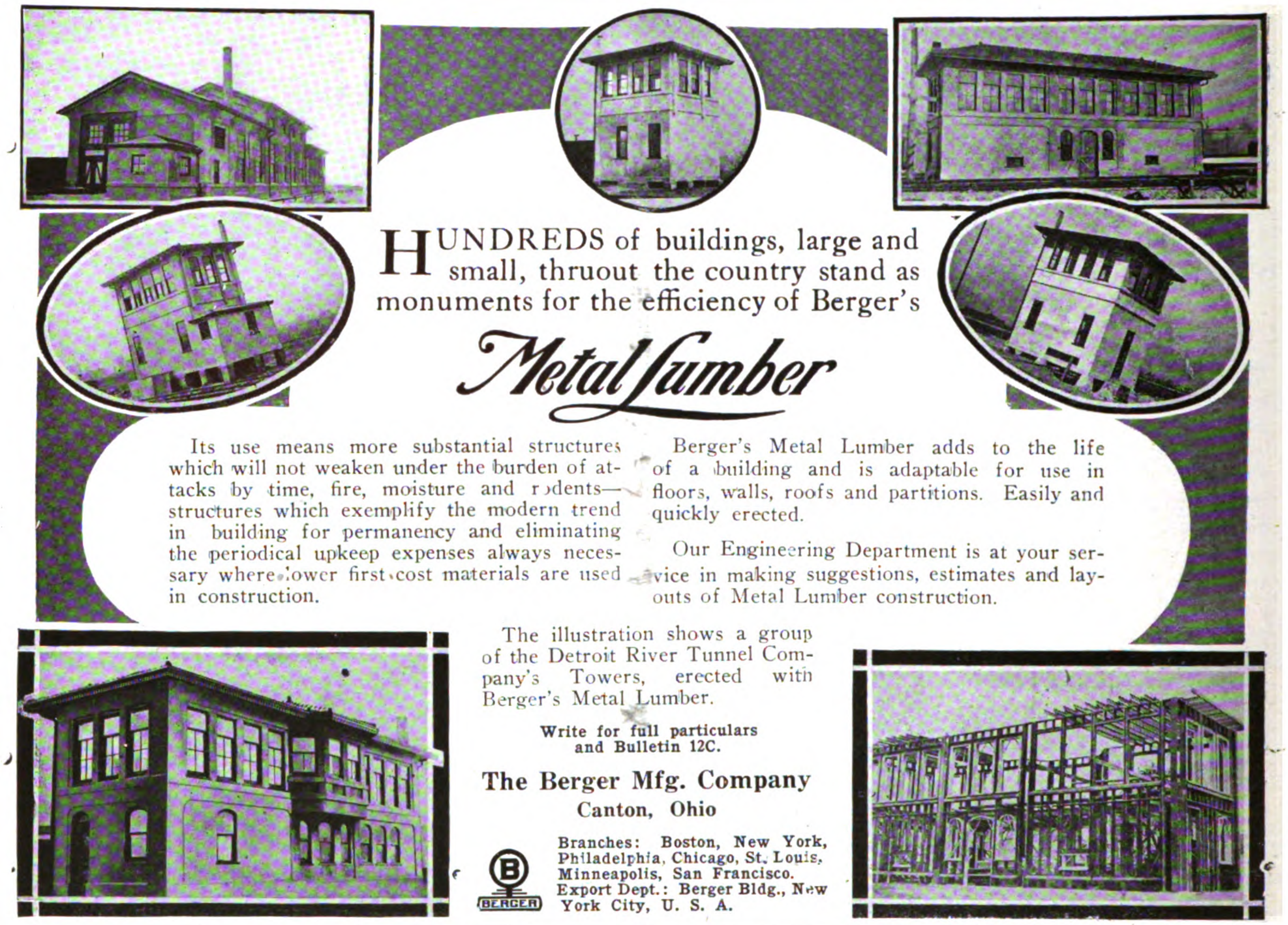
"Arches and piers constructed with standard tile.

"Strength where it is needed to carry accumulative load."

Two new public school buildings, one to cost about $400,000 and the other not to exceed $270,000 are planned for Harrisburg, Pa.

The first of the proposed quarterly gatherings of the recently formed New York State branch of the American Ceramic Society, will be held early in May either in Syracuse or Schenectady.

To still further develop its business the H. M. Reynolds Shingle Company, of Grand Rapids, Mich., has increased its capital to $400,000.



HUNDREDS of buildings, large and small, thruout the country stand as monuments for the efficiency of Berger's

Metal Lumber

Its use means more substantial structures which will not weaken under the burden of attacks by time, fire, moisture and rodents—structures which exemplify the modern trend in building for permanency and eliminating the periodical upkeep expenses always necessary where lower first cost materials are used in construction.

Berger's Metal Lumber adds to the life of a building and is adaptable for use in floors, walls, roofs and partitions. Easily and quickly erected.

Our Engineering Department is at your service in making suggestions, estimates and layouts of Metal Lumber construction.

The illustration shows a group of the Detroit River Tunnel Company's Towers, erected with Berger's Metal Lumber.

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New Buildings for State of Washington

According to "Stone" the State of Washington is planning and constructing a group of capitol buildings at Olympia. Plans have just been completed for the concentration of thirty State departments in a new administration building to be erected on the old capitol foundation, and bids will soon be called for. The State is about ready to award contracts for the completion of the temple of justice, designed by W. R. Wilder, of New York. The commission plans to spend approximately $250,000 on this work, and possibly up to $100,000 later for interior finish for the temple, which has been in a state of incompleteness since it was built in 1911. Occupants of the temple are the supreme court, attorney general and state library. The state has already spent $350,000 upon it.

The proposed administration building will be 268 feet long by 156 feet wide, three stories high above the basement, and it will contain 160 rooms. Its cost, to be paid out of the ½-mill levy appropriated last winter, will be in the neighborhood of $500,000.

The main entrance on the first floor will be reached by granite steps 52 feet long, and the front will be ornamented by 12 stone columns each 40 feet long. Reinforced concrete is the plan of structure approved, the exterior to be finished in the same kind of stone the commission selects for the outside wall of the temple of justice, first of the capitol group buildings to be erected. All state department heads have been consulted by Architect Julius Zittel in planning the administration building for their particular needs and conveniences.

Enters Broader Field of Effort

Ralph C. Davison, for the past six years associated with the American Mason Safety Tread Co., in a selling and engineering capacity, has resigned his position and directorship with that company to engage in a broader and more active field with the American Abrasive Metals Company, makers of Feralun Safety Treads and anti-slip surfaces. Mr. Davison, through his connection with the Concrete Association of America, has a large acquaintance among architects and contractors, and as associate editor of the "Railroad Gazette," made many friends among railroad men.

Incorporation of Prominent Engineering Firm

Ford, Bacon & Davis, engineers, announce the formation of the Ford, Bacon & Davis Corporation, organized for the purpose of conducting a general contracting business, with particular reference to industrial, public utility and power plants, steam and street railroads, docks, steamship and railway terminal facilities, subways, tunnels, hydroelectric and irrigation projects. In effect this means the continuance in corporate form of construction work which heretofore has been handled by the firm direct.

The corporation's organization comprises men skilled and experienced in engineering and contracting work by the most modern and economical methods. It is provided with ample capital to insure the successful completion of any work which it may undertake, and starts business with important work already entrusted to it. Its headquarters are at 115 Broadway, New York, with offices at New Orleans and San Francisco.

The Fire Hazard of Hotels

First among the dangers to which patrons of hotels are subjected is that of fire, a truism not so fully appreciated by the traveling public as it should be. In discussing this hazard the "Travelers Standard," published by the engineering and inspection division of the Travelers Insurance Company says:

In the fire hazard the hotel management, the employes, and the guests have an ever-present menace of varying degree,—the seriousness of the hazard depending largely upon the physical condition of the hotel. We cannot at this time discuss the hotel fire hazard in detail, but it seems advisable to indicate the extremes. In the United States there are hundreds of small hotels in which the only fireproof things are the door knobs, the heating and cooking apparatus, and the steel pen at the registration desk. This, of course, does not include the bar-room stock, which is fireproof in a limited sense only. The fire-fighting apparatus often consists of a volunteer bucket brigade, or a fire engine manned by volunteer firemen. In contrast to this some of our modern hotels embody all that the ingenuity of man has devised for making buildings proof against fire. This includes fireproof materials for walls, floors, ceilings, partitions, wire glass for windows, special fire walls, sprinkler systems, fire hose on each floor, and as great a portion as possible of the room furniture and furnishings of fireproof material.

The physical condition of a hotel is a matter lying within the jurisdiction of the owners and the city authorities, and the guest must accept conditions as he finds them, for he has no authority to make improvements, even if he has the inclination. He can, however, so conduct himself that no act of his will expose either himself or the other guests to the hazards of a fire. A large number of hotel fires have been started by guests who have thrown lighted matches in the general direction of a waste basket or cuspidor. The match may be wholly extinguished in its flight, and if so no harm will result; but if it is still burning when it strikes, it is largely a matter of chance whether or not the blaze or spark will ignite inflammable material in or about the waste basket. Fires have been started by lighted cigars and cigarettes left on stands and bureaus, and by cigars and cigarettes in the hands of guests who are addicted to the dangerous habit of smoking in bed. Electrical heating appliances, when left with the current turned on, have also been responsible for more than one disastrous conflagration. All fires from such causes may be prevented by the exercise of ordinary precaution and care. Self-preservation—the first law of nature—ought to be a sufficient reason for everyone to do his part in keeping down the number of hotel fires.

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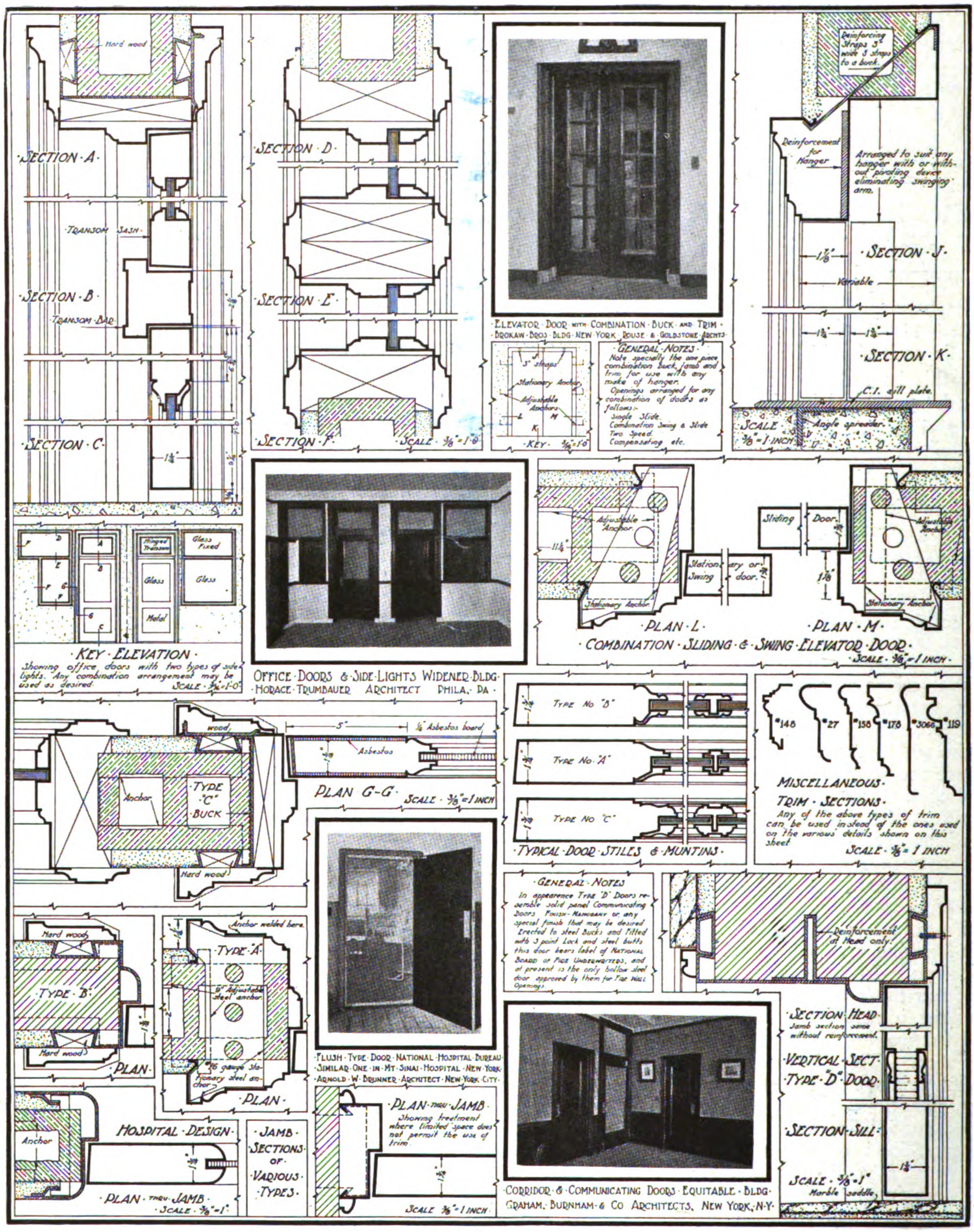
FIRE SAFE DOOR WAYS

STEEL DOORS, BUCKS and TRIM



·ELEVATOR·DOOR·WITH·COMBINATION·BUCK·AND·TRIM·
·BROKAW·BROS·BLDG·NEW·YORK·ROUSE·&·GOLDSTONE·ARCHTS·

·GENERAL·NOTES·
Note specially the one piece combination buck, jamb and trim for use with any make of hanger.
Openings arranged for any combination of doors as follows:-
Single Slide.
Combination Swing & Slide
Two Speed.
Compensating etc.

·KEY·ELEVATION·
Showing office doors with two types of side lights. Any combination arrangement may be used as desired.
SCALE·3/16"=1'-0"

OFFICE·DOORS & SIDE·LIGHTS WIDENER·BLDG·
·HORACE·TRUMBAUER ARCHITECT PHILA.· PA·

MISCELLANEOUS·
TRIM·SECTIONS·
Any of the above types of trim can be used instead of the ones used on the various details shown on this sheet
SCALE·⅜"=1 INCH

·GENERAL·NOTES
In appearence Type "D" Doors resemble solid panel Communicating Doors. Finish—Mahogany or any special finish that may be desired. Erected to steel Bucks and Fitted with 3 point Lock and steel butts. This door bears label of NATIONAL BOARD OF FIRE UNDERWRITERS, and at present is the only hollow steel door approved by them for Fire Wall Openings.

·FLUSH·TYPE·DOOR·NATIONAL·HOSPITAL·BUREAU·
·SIMILAR·ONE·IN·MT·SINAI·HOSPITAL·NEW·YORK·
·ARNOLD·W·BRUNNER·ARCHITECT·NEW·YORK·CITY·

·PLAN·THRU·JAMB·
Showing treatment where limited space does not permit the use of trim

CORRIDOR·&·COMMUNICATING DOORS·EQUITABLE·BLDG·
GRAHAM, BURNHAM·& CO ARCHITECTS, NEW YORK, N.Y.

EMPIRE ART METAL COMPANY

COLLEGE POINT NEW YORK U. S. A.

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THE NATIONAL FIRESAFE BUILDING PUBLICATION

CONSTRUCTION

WITH A DEPARTMENT DEVOTED TO

SAFE HOMES

AUGUST 1917

VOLUME FIVE

NUMBER TWO

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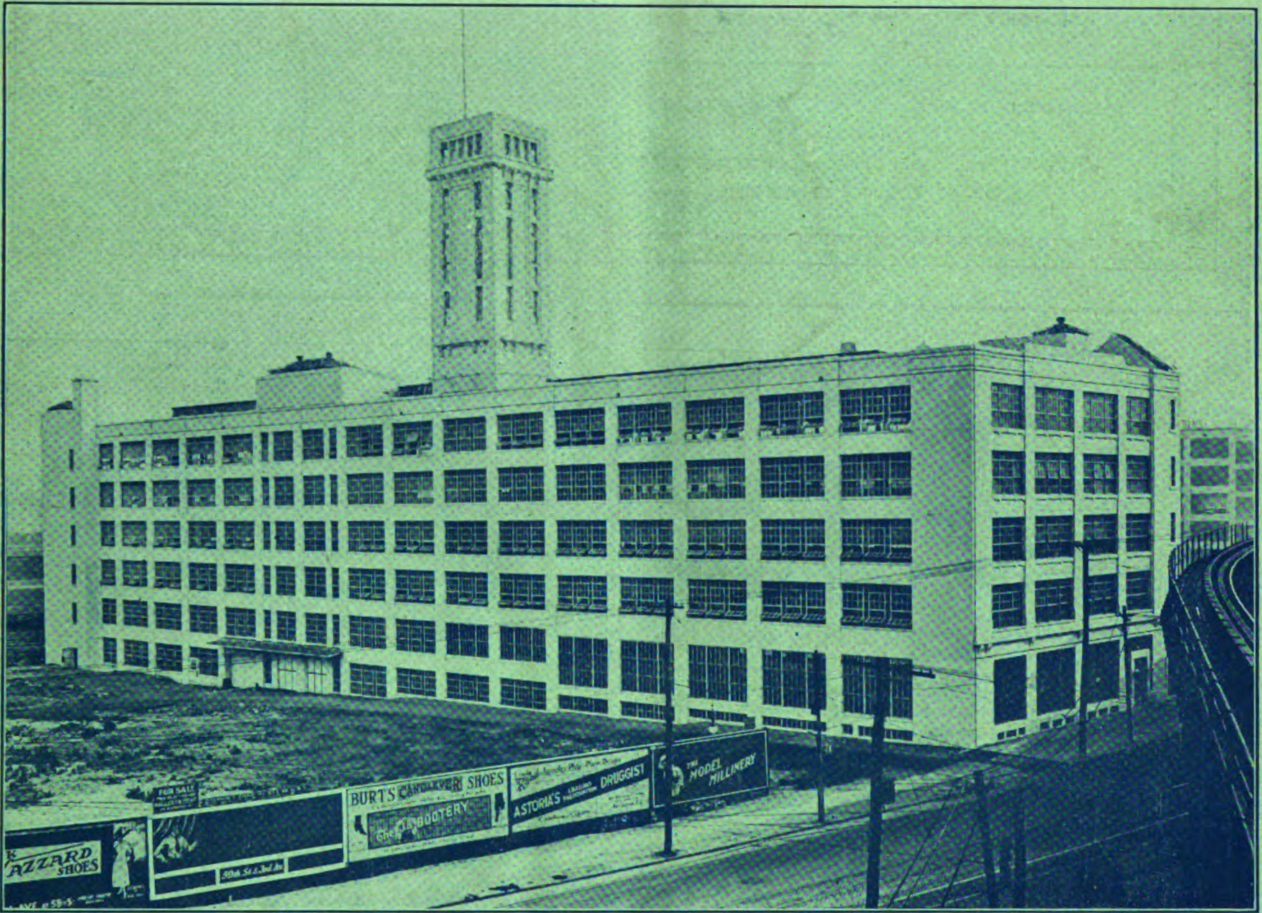

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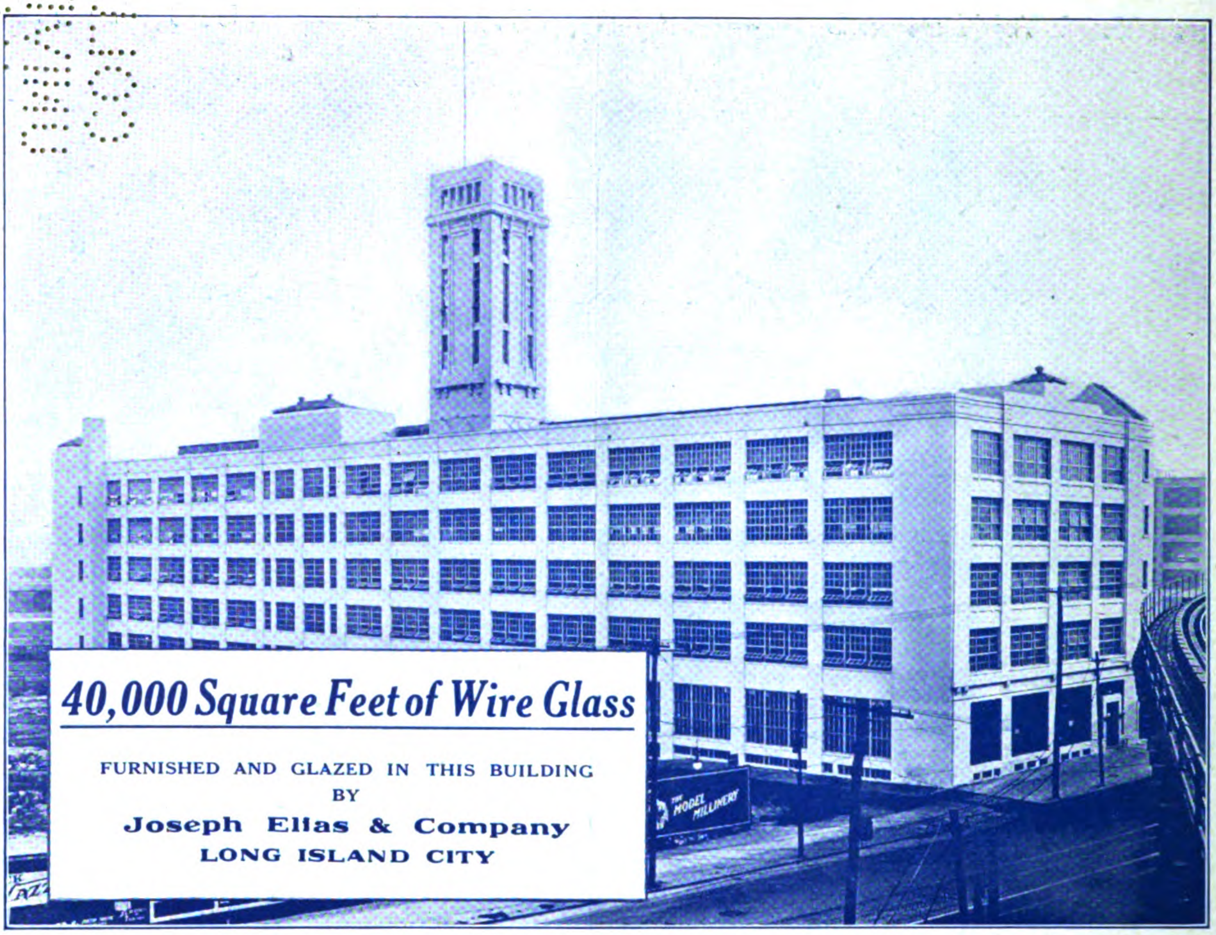

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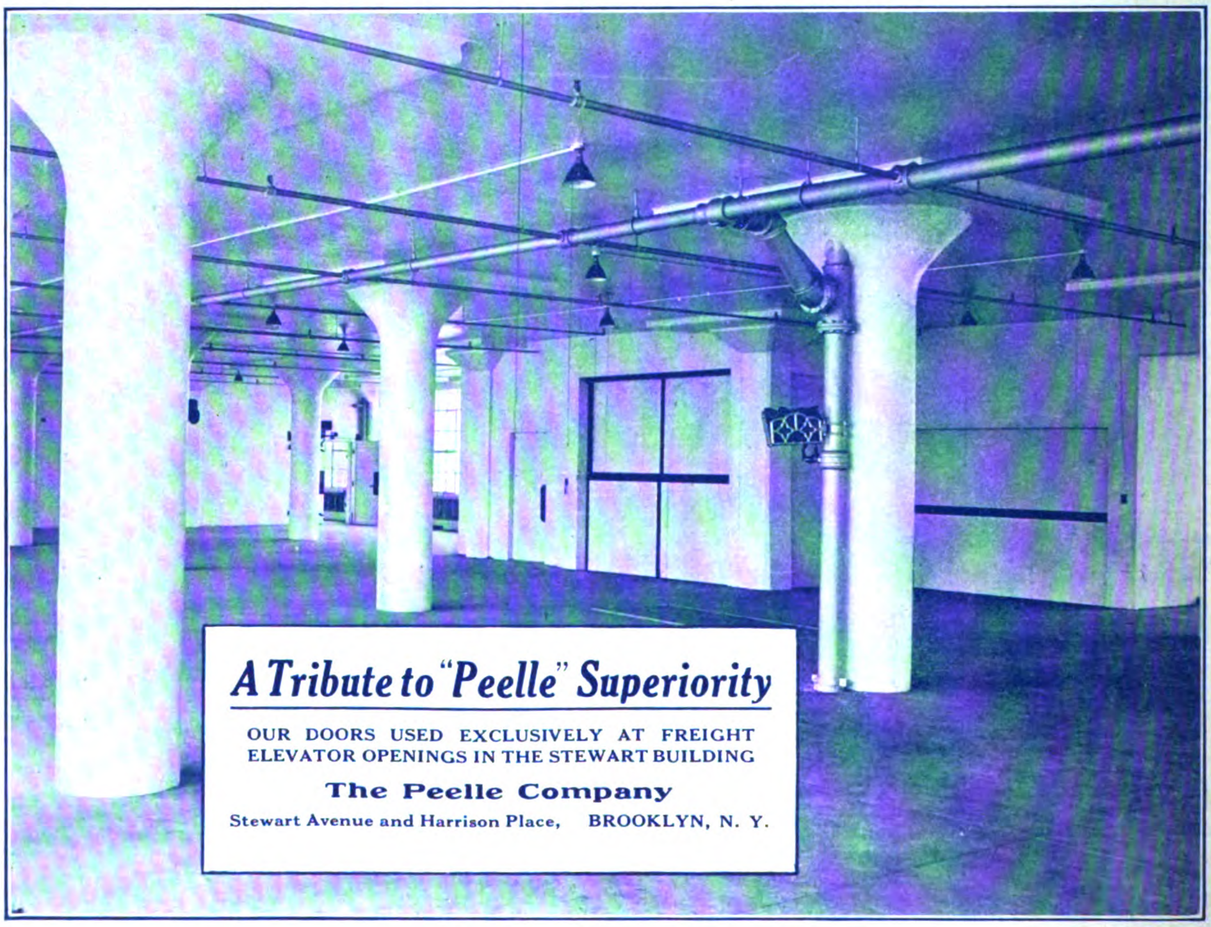

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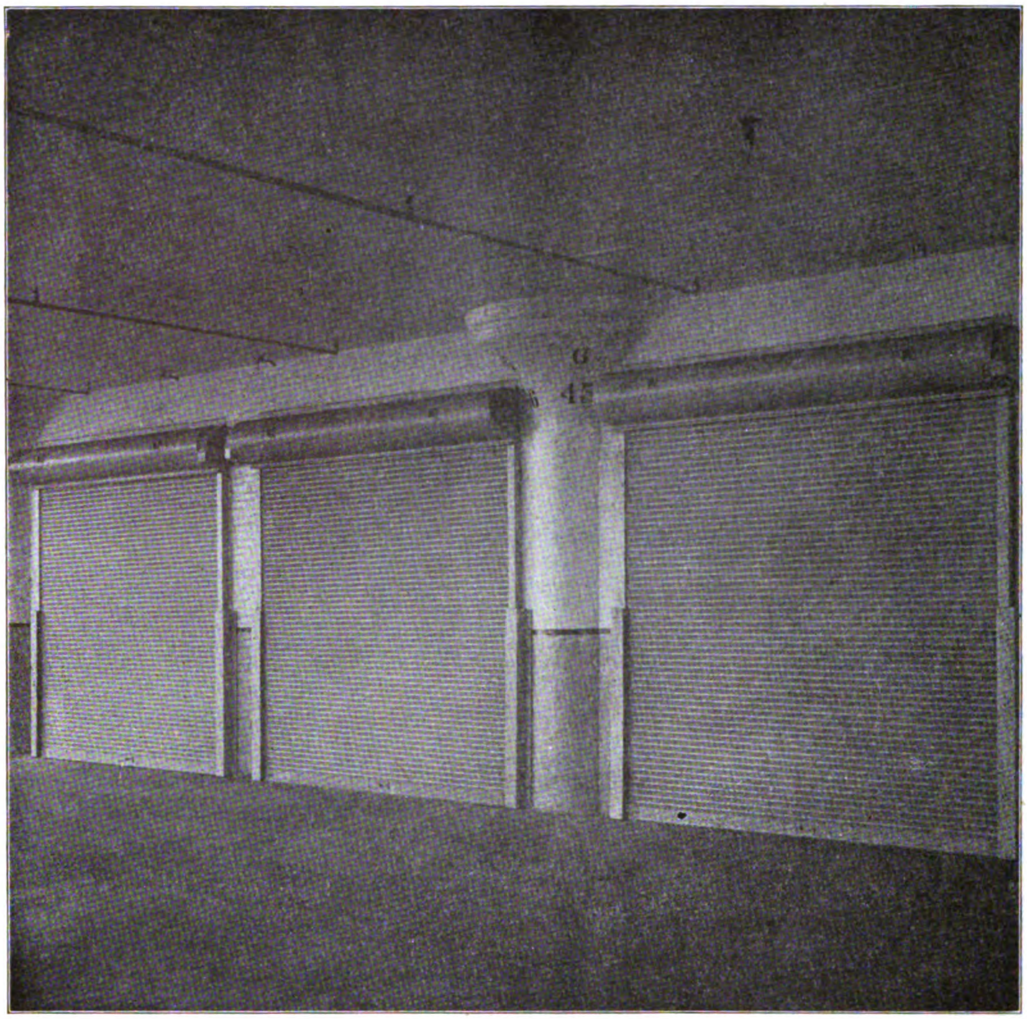

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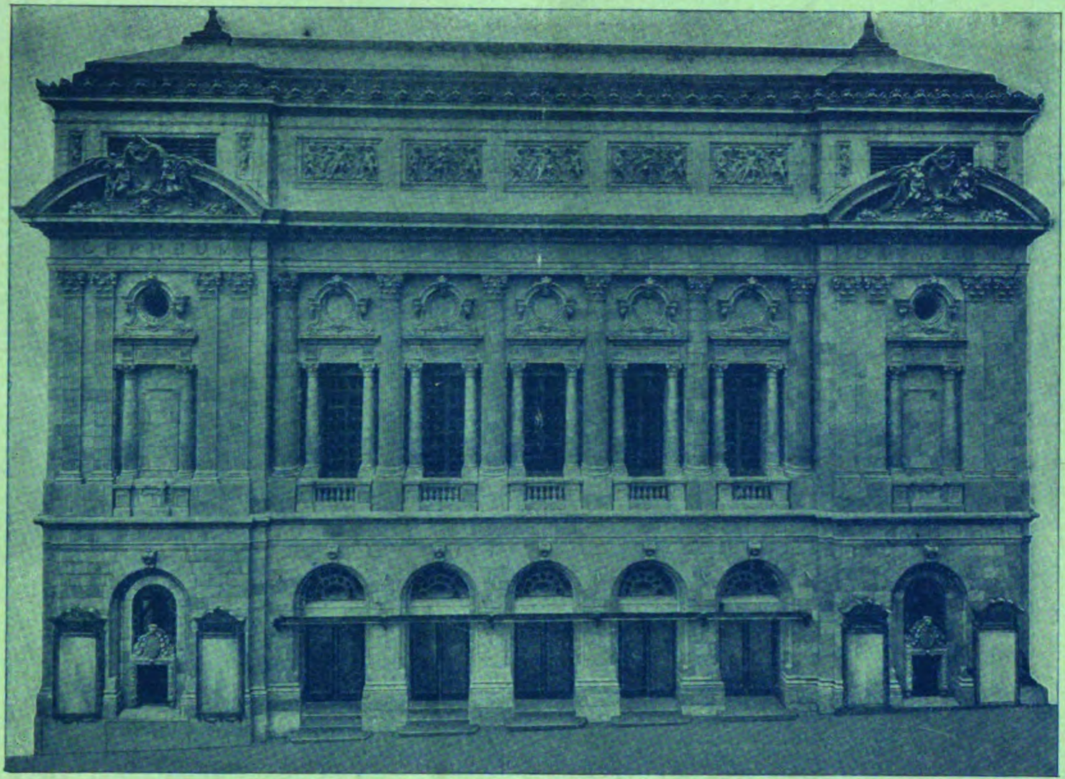

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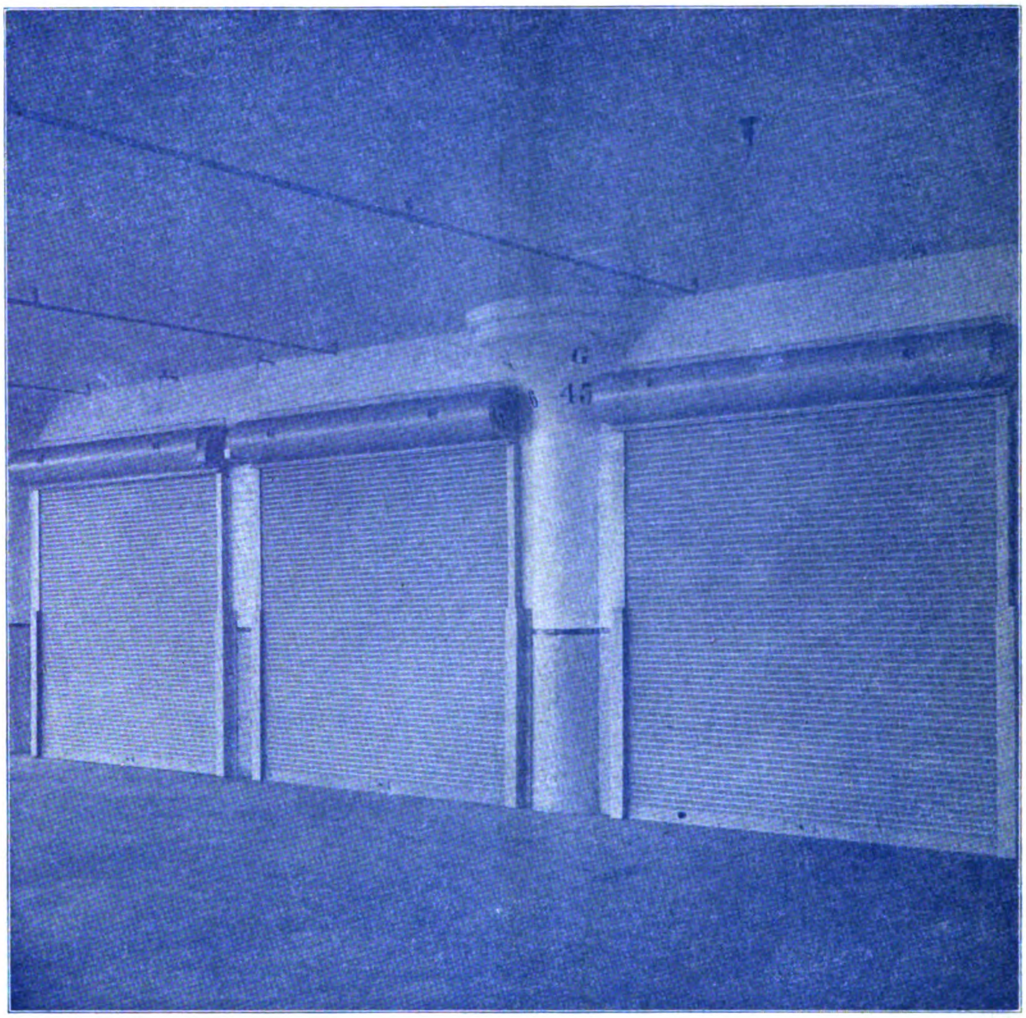

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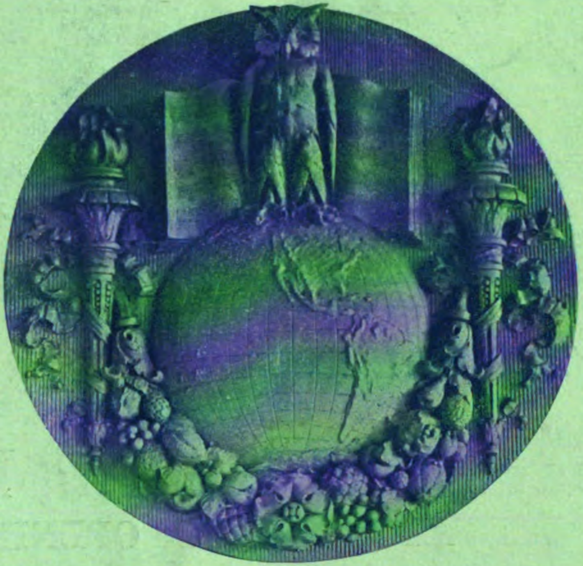

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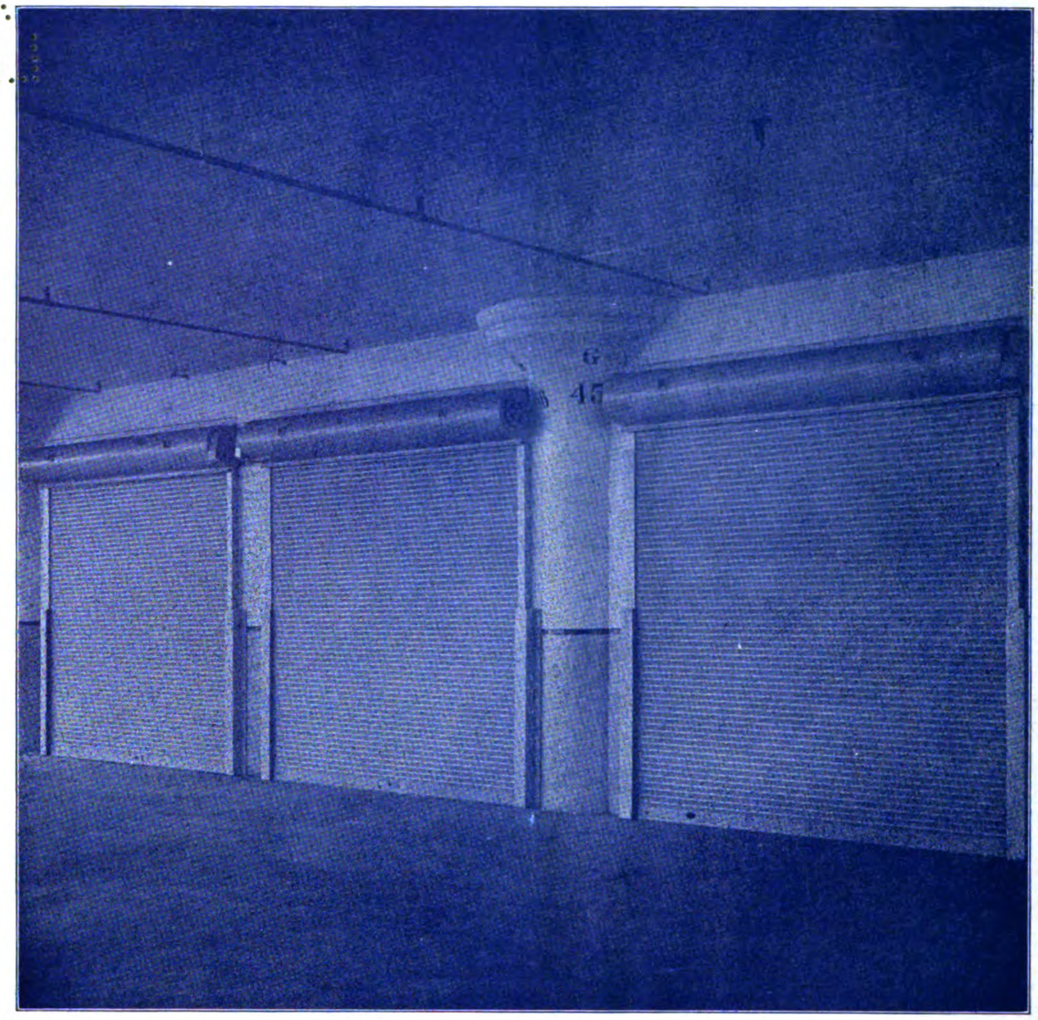

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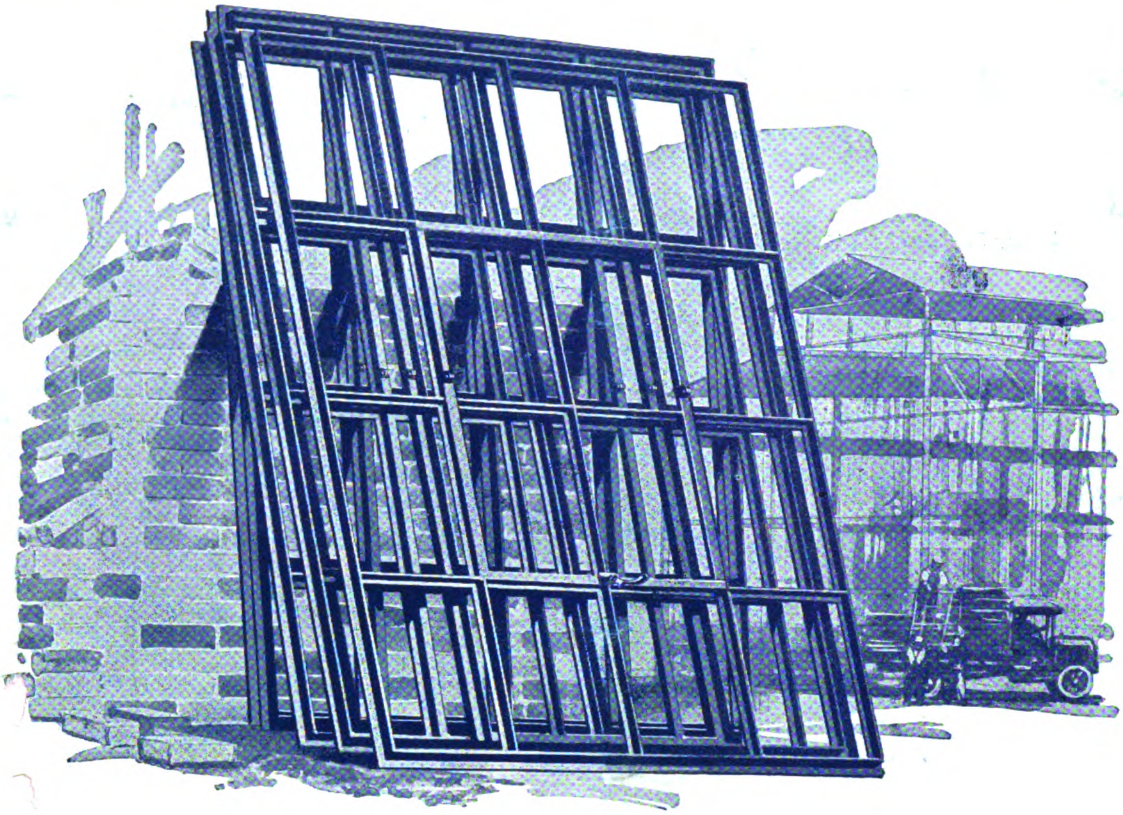

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9′ 3⅛″	10′ 3⅛″
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